TITLE: PASSWORD STRENGTH CHECKING METHOD AND APPARATUS AND PROGRAM AND RECORDING MEDIUM....
INVENTORS: Daiji SANAI et al.
SERIAL NO.: Unassigned
DOCKET NO.: 1391.1049

FIG. 1

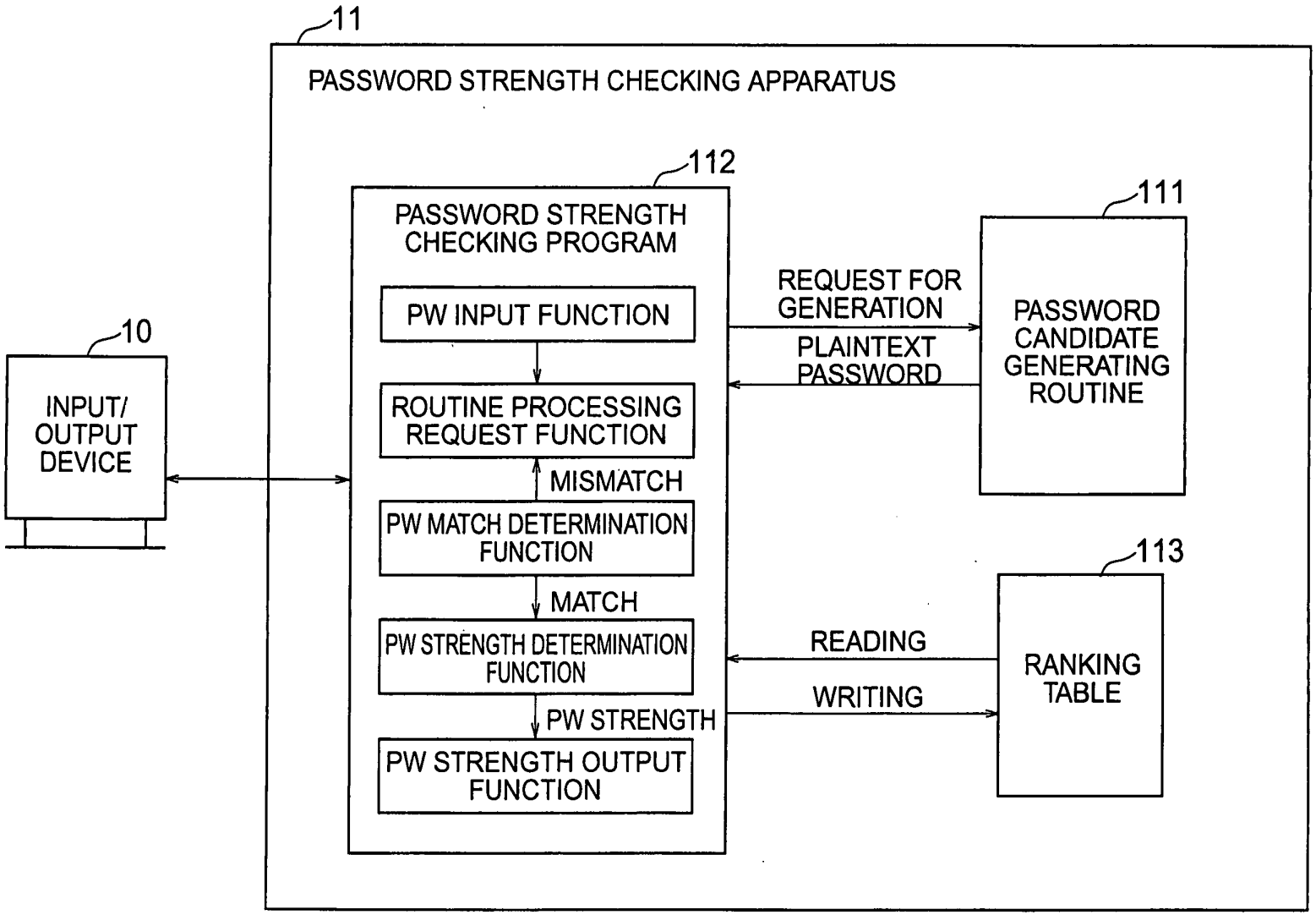

FIG. 2

RANK	USER NAME	SCORE	PASSWORD
1	××××××××××	64 POINTS	□□□□□□□□□□
2	△△△△△△△△△△	47 POINTS	○○○○○○○○○○
.	.	.	.
.	.	.	.
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.	.	.	.
.	.	.	.
.	.	.	.
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.	.	.	.
.	.	.	.
.	.	.	.
.	.	.	.
.	.	.	.

FIG. 3

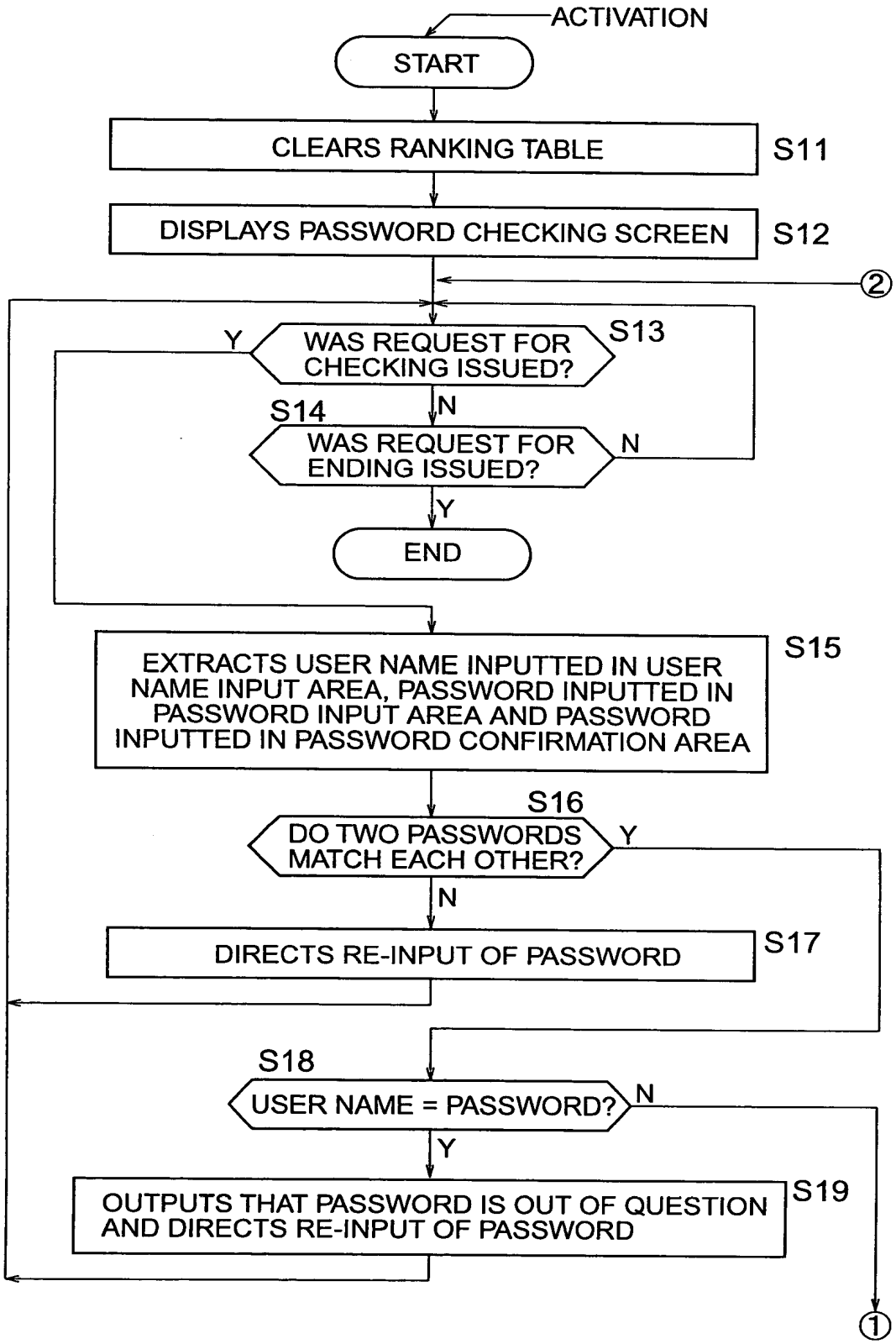
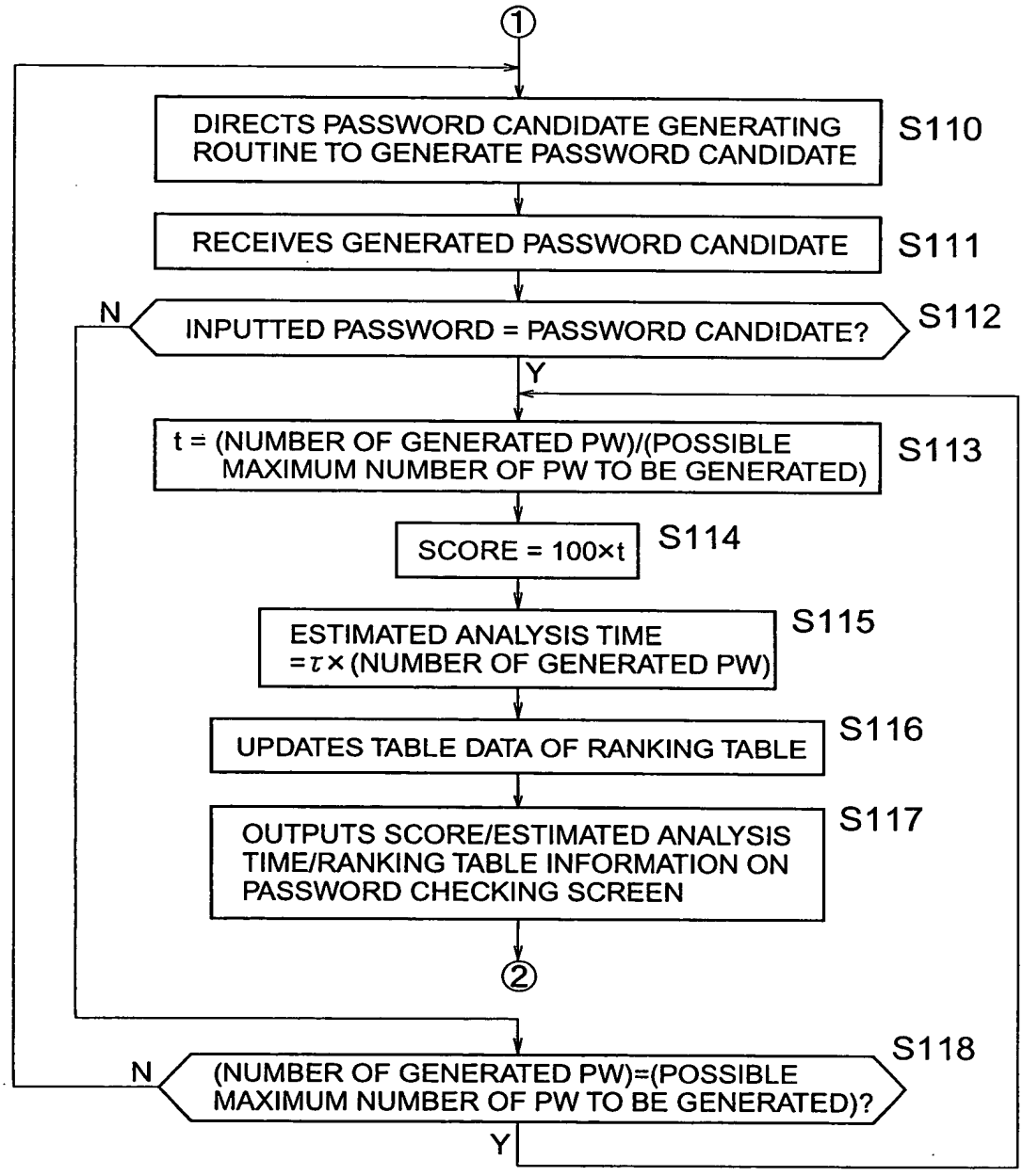
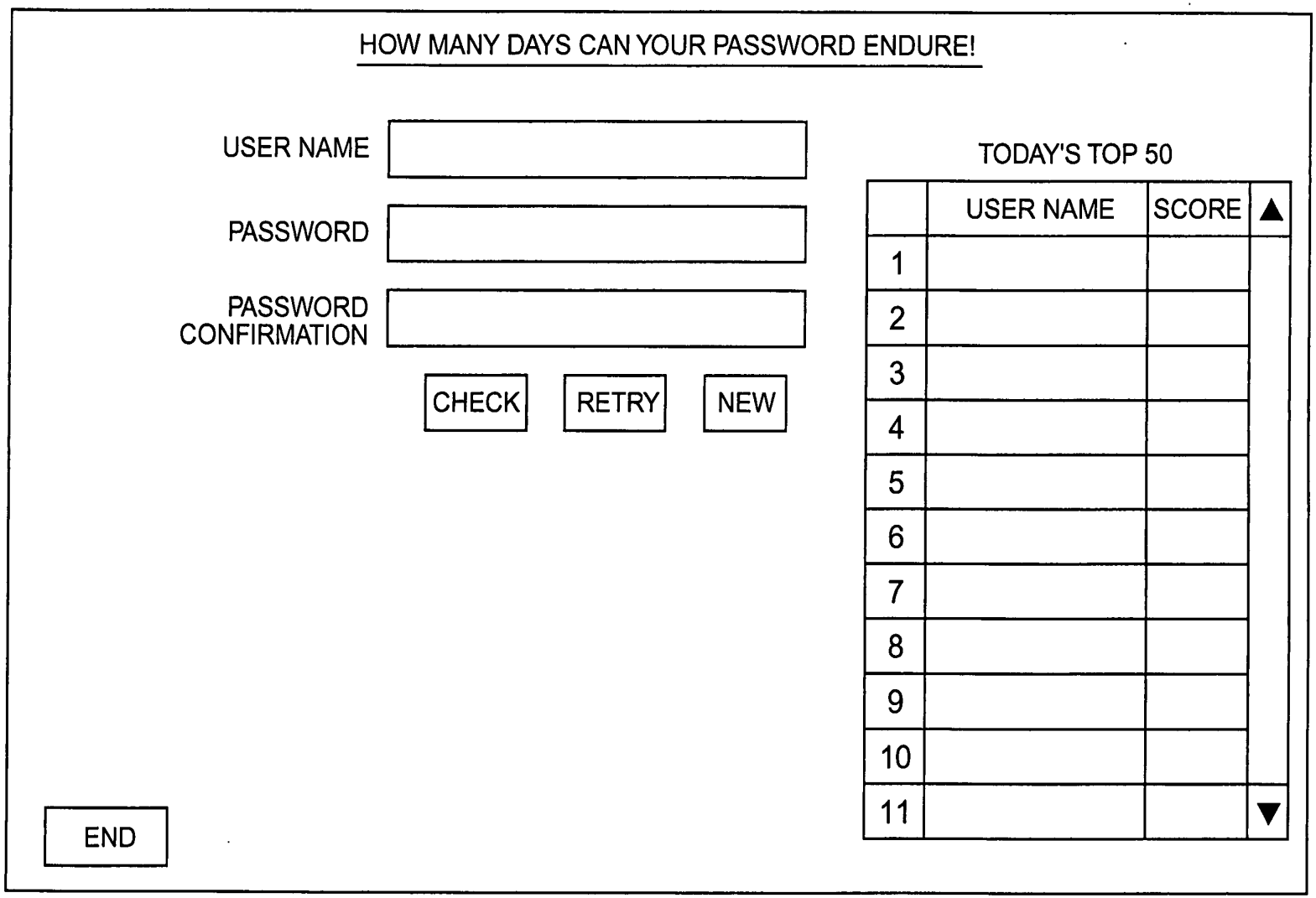

ACTIVATION
START
CLEARS RANKING TABLE
S11
DISPLAYS PASSWORD CHECKING SCREEN
S12
②
Y
WAS REQUEST FOR CHECKING ISSUED?
S13
S14
N
WAS REQUEST FOR ENDING ISSUED?
N
Y
END
EXTRACTS USER NAME INPUTTED IN USER NAME INPUT AREA, PASSWORD INPUTTED IN PASSWORD INPUT AREA AND PASSWORD INPUTTED IN PASSWORD CONFIRMATION AREA
S15
S16
DO TWO PASSWORDS MATCH EACH OTHER?
Y
N
DIRECTS RE-INPUT OF PASSWORD
S17
S18
USER NAME = PASSWORD?
N
Y
OUTPUTS THAT PASSWORD IS OUT OF QUESTION AND DIRECTS RE-INPUT OF PASSWORD
S19
①

FIG. 4


①
DIRECTS PASSWORD CANDIDATE GENERATING ROUTINE TO GENERATE PASSWORD CANDIDATE
S110
RECEIVES GENERATED PASSWORD CANDIDATE
S111
N
INPUTTED PASSWORD = PASSWORD CANDIDATE?
S112
Y
t = (NUMBER OF GENERATED PW)/(POSSIBLE MAXIMUM NUMBER OF PW TO BE GENERATED)
S113
SCORE = 100×t
S114
ESTIMATED ANALYSIS TIME =τ×(NUMBER OF GENERATED PW)
S115
UPDATES TABLE DATA OF RANKING TABLE
S116
OUTPUTS SCORE/ESTIMATED ANALYSIS TIME/RANKING TABLE INFORMATION ON PASSWORD CHECKING SCREEN
S117
②
N
(NUMBER OF GENERATED PW)=(POSSIBLE MAXIMUM NUMBER OF PW TO BE GENERATED)?
S118
Y

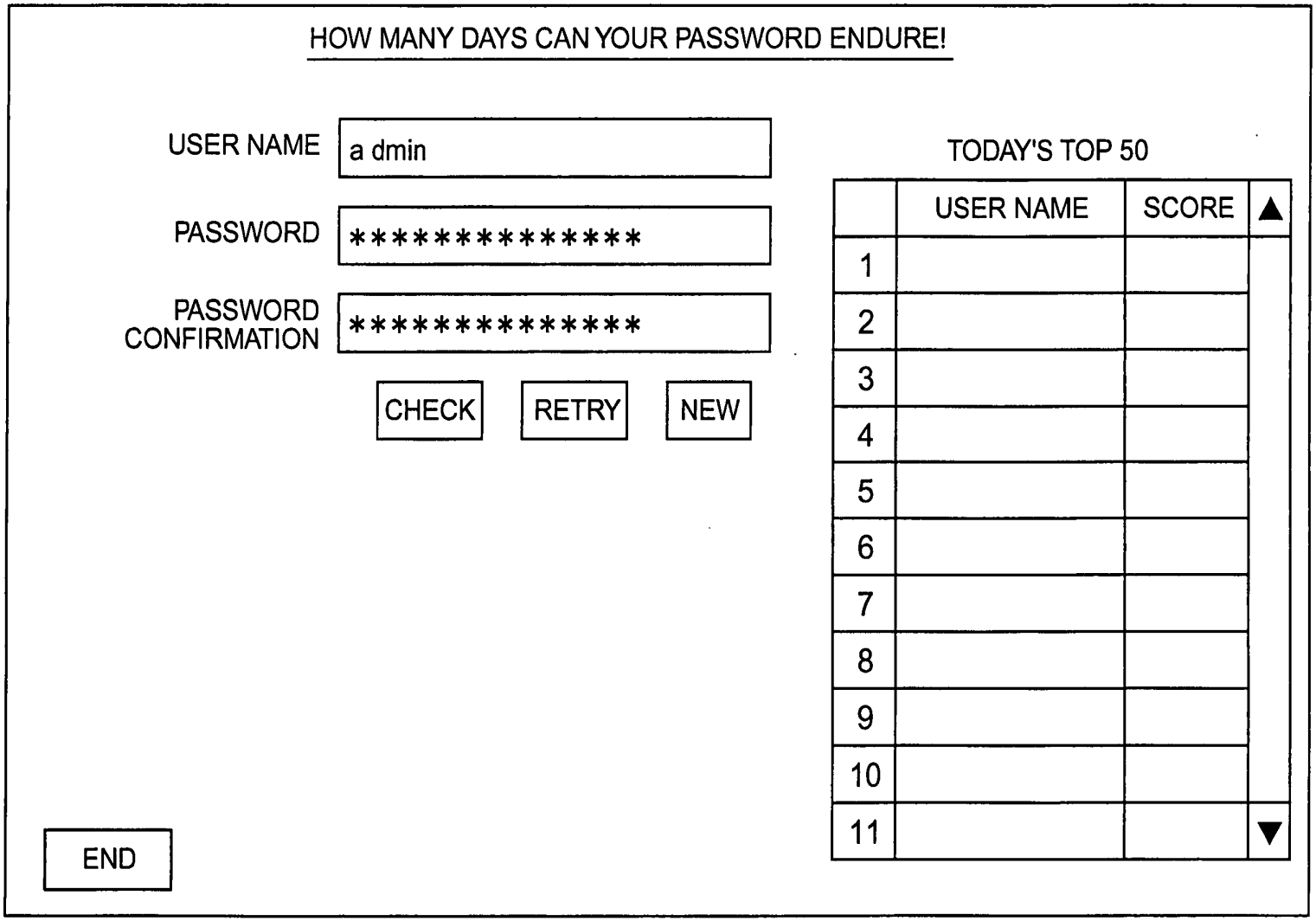
TITLE: PASSWORD STRENGTH CHECKING METHOD AND APPARATUS AND PROGRAM AND RECORDING MEDIUM....
INVENTORS: Daiji SANAI et al.
SERIAL NO.: Unassigned
DOCKET NO.: 1391.1049

FIG. 5



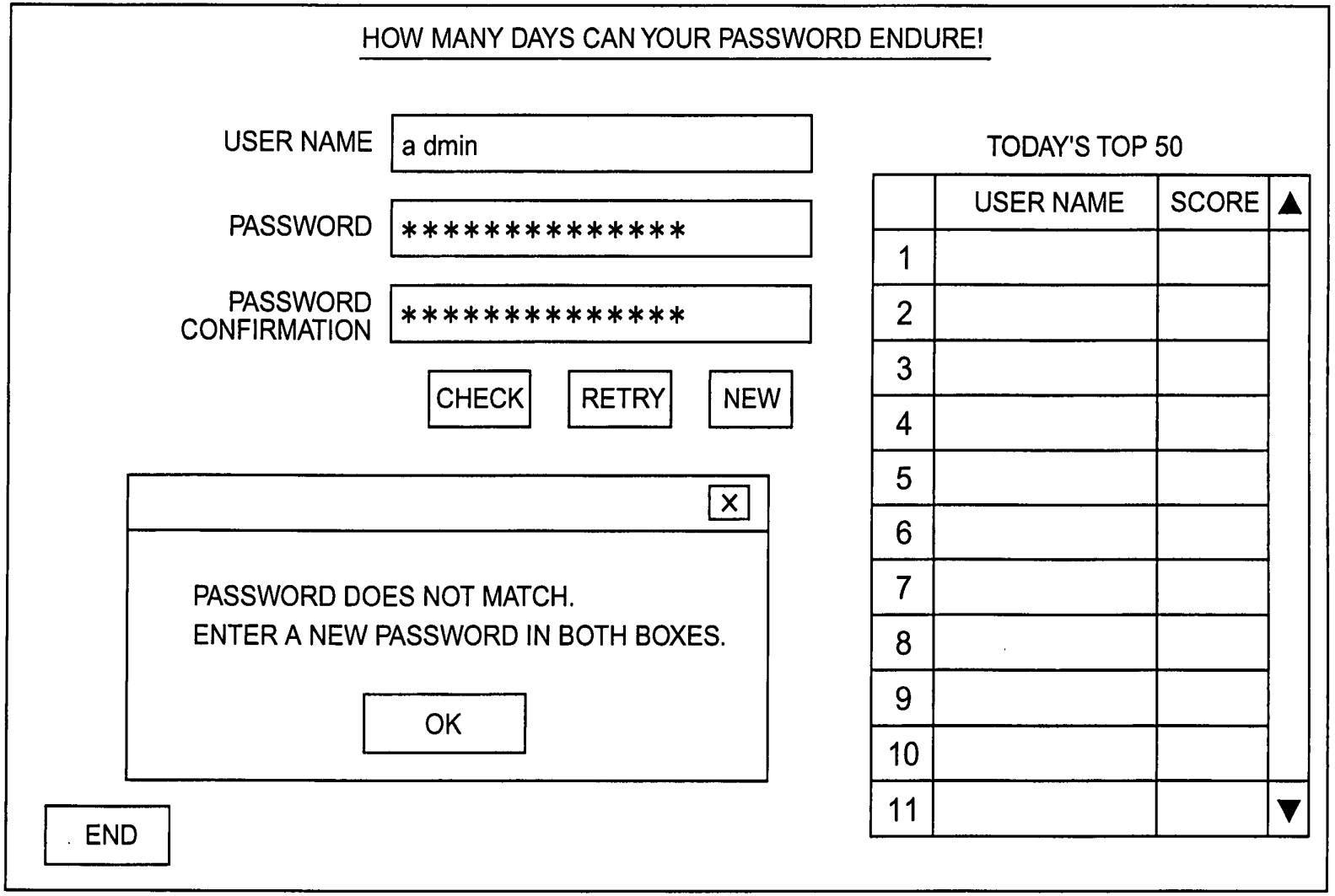
TITLE: PASSWORD STRENGTH CHECKING METHOD AND APPARATUS AND PROGRAM AND RECORDING MEDIUM....
INVENTORS: Daiji SANAI et al.
SERIAL NO.: Unassigned
DOCKET NO.: 1391.1049

FIG. 6



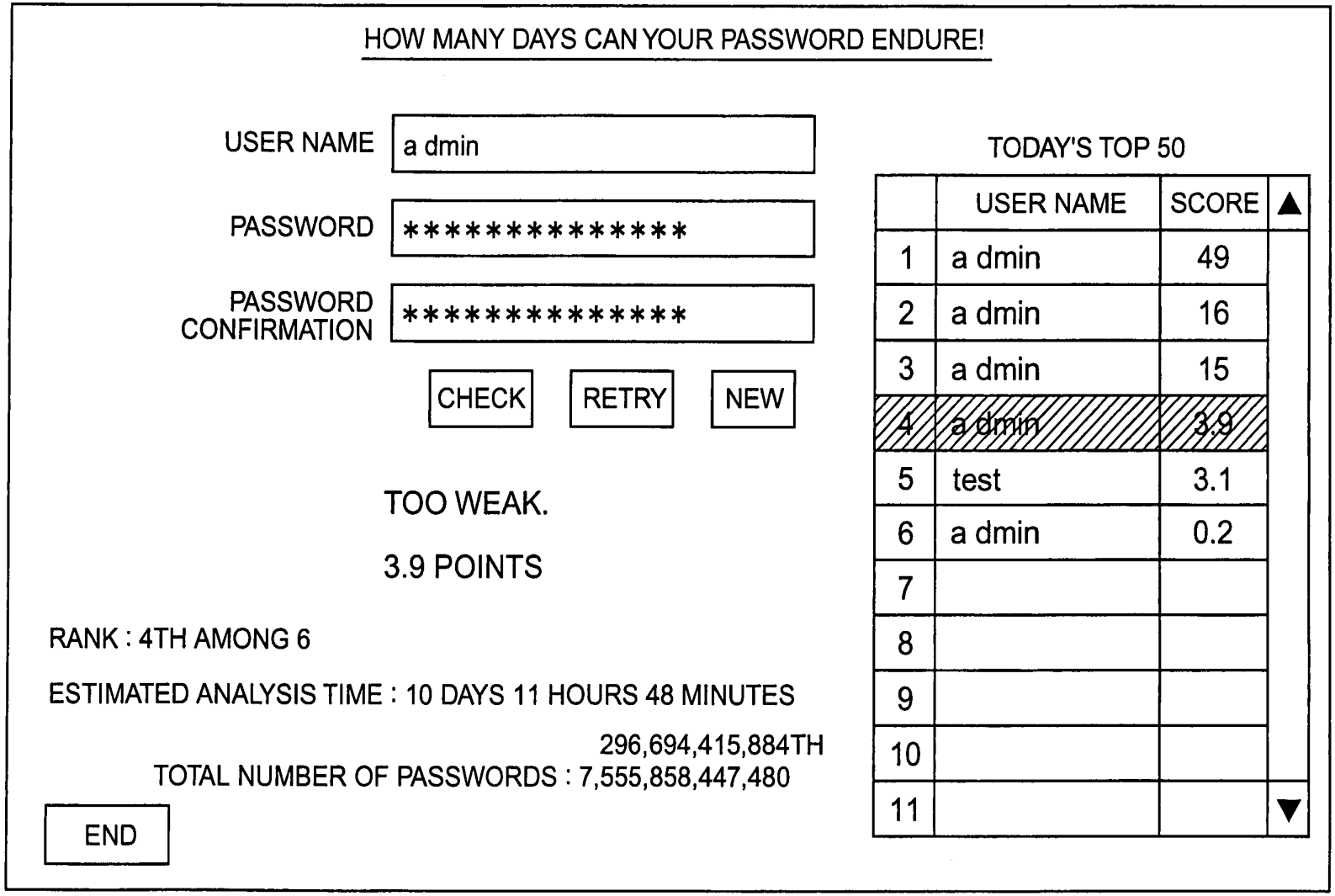
TITLE: PASSWORD STRENGTH CHECKING METHOD AND APPARATUS AND PROGRAM AND RECORDING MEDIUM....
INVENTORS: Daiji SANAI et al.
SERIAL NO.: Unassigned
DOCKET NO.: 1391.1049

FIG. 7



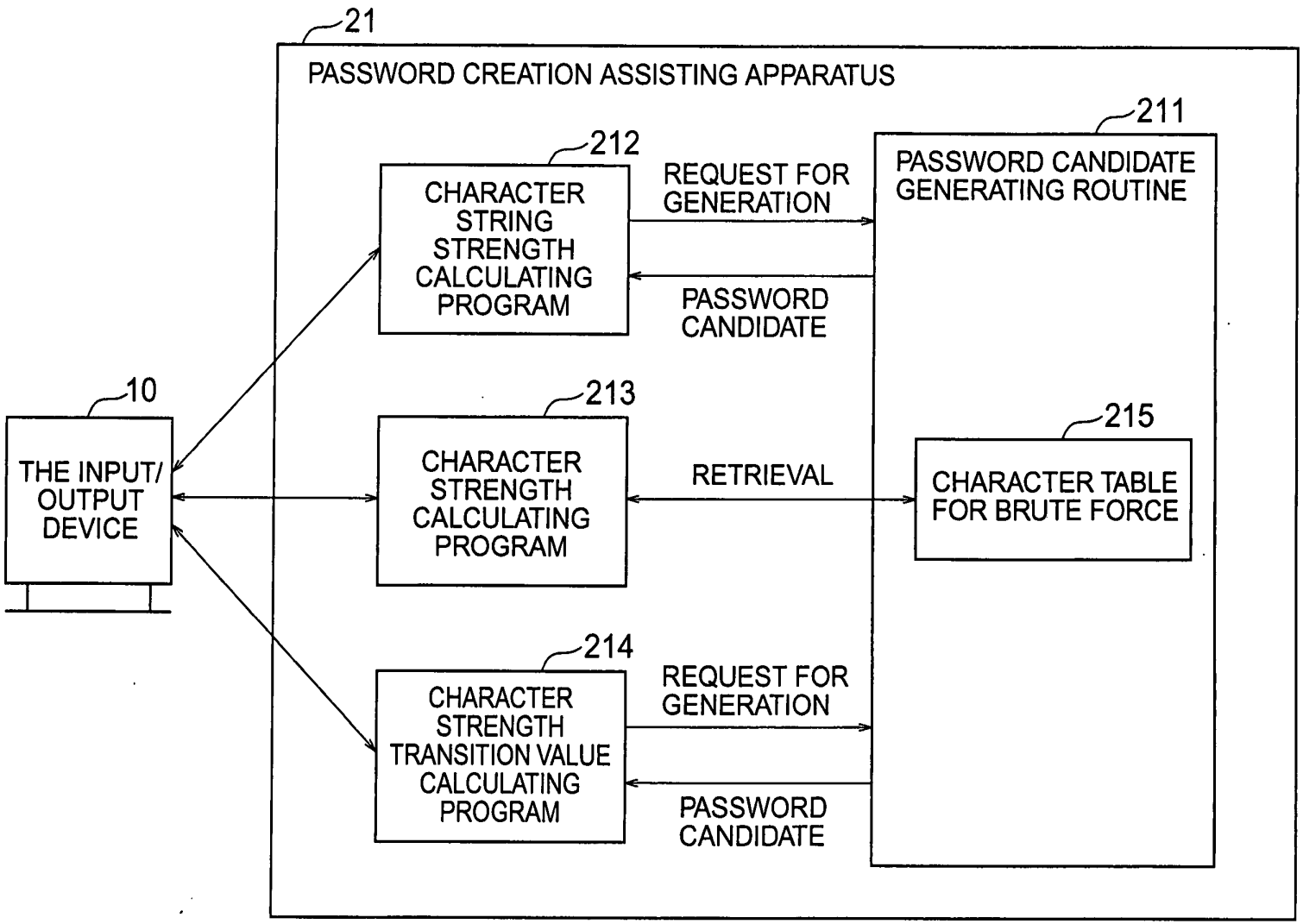
TITLE: PASSWORD STRENGTH CHECKING METHOD AND APPARATUS AND PROGRAM AND RECORDING MEDIUM....
INVENTORS: Daiji SANAI et al.
SERIAL NO.: Unassigned
DOCKET NO.: 1391.1049

FIG. 8



TITLE: PASSWORD STRENGTH CHECKING METHOD AND APPARATUS AND PROGRAM AND RECORDING MEDIUM....
INVENTORS: Daiji SANAI et al.
SERIAL NO.: Unassigned
DOCKET NO.: 1391.1049

FIG. 9



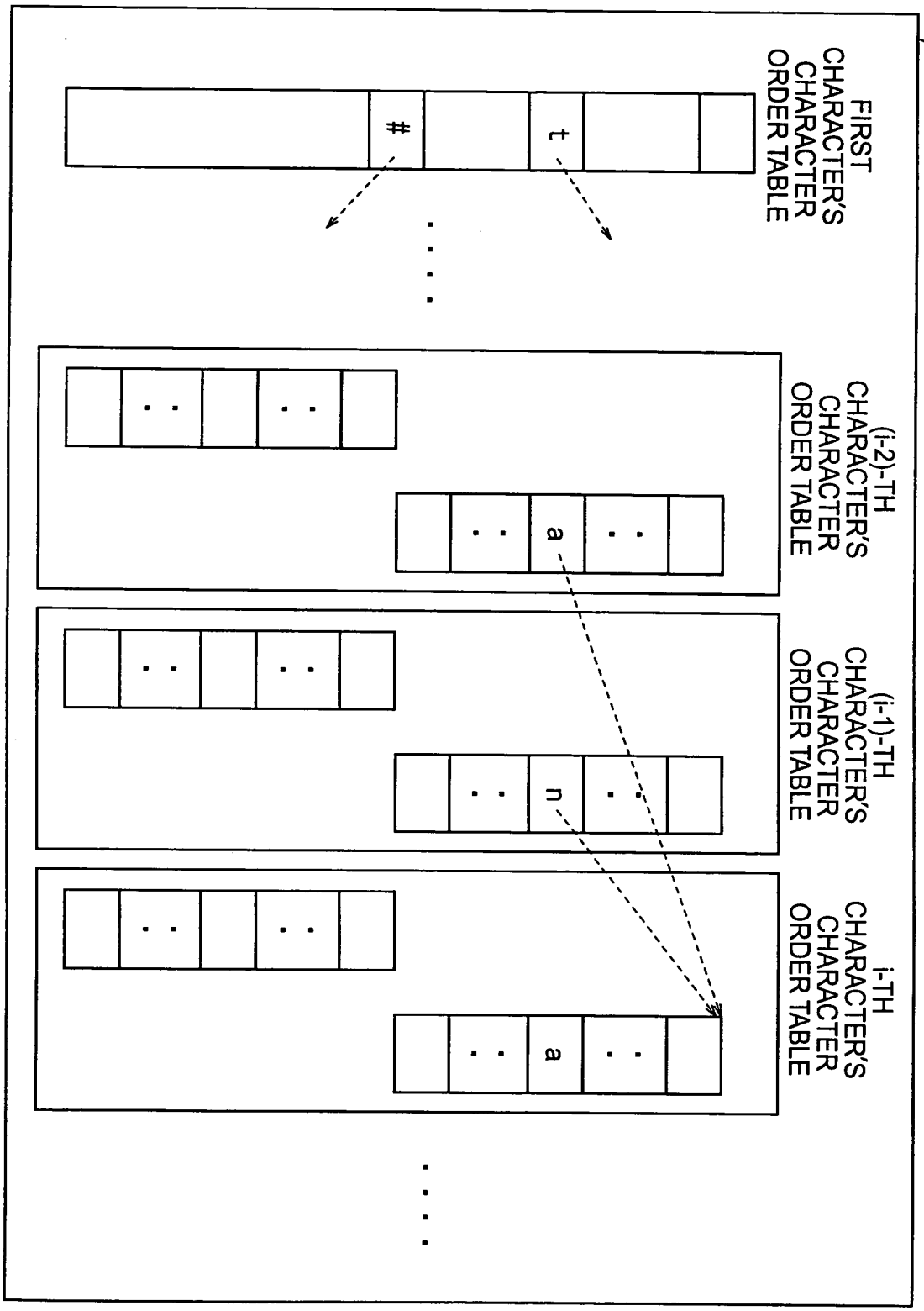

215
FIRST CHARACTER'S CHARACTER ORDER TABLE
#
t
(i-2)-TH CHARACTER'S CHARACTER ORDER TABLE
a
(i-1)-TH CHARACTER'S CHARACTER ORDER TABLE
n
i-TH CHARACTER'S CHARACTER ORDER TABLE
a

FIG. 10

FIG. 11

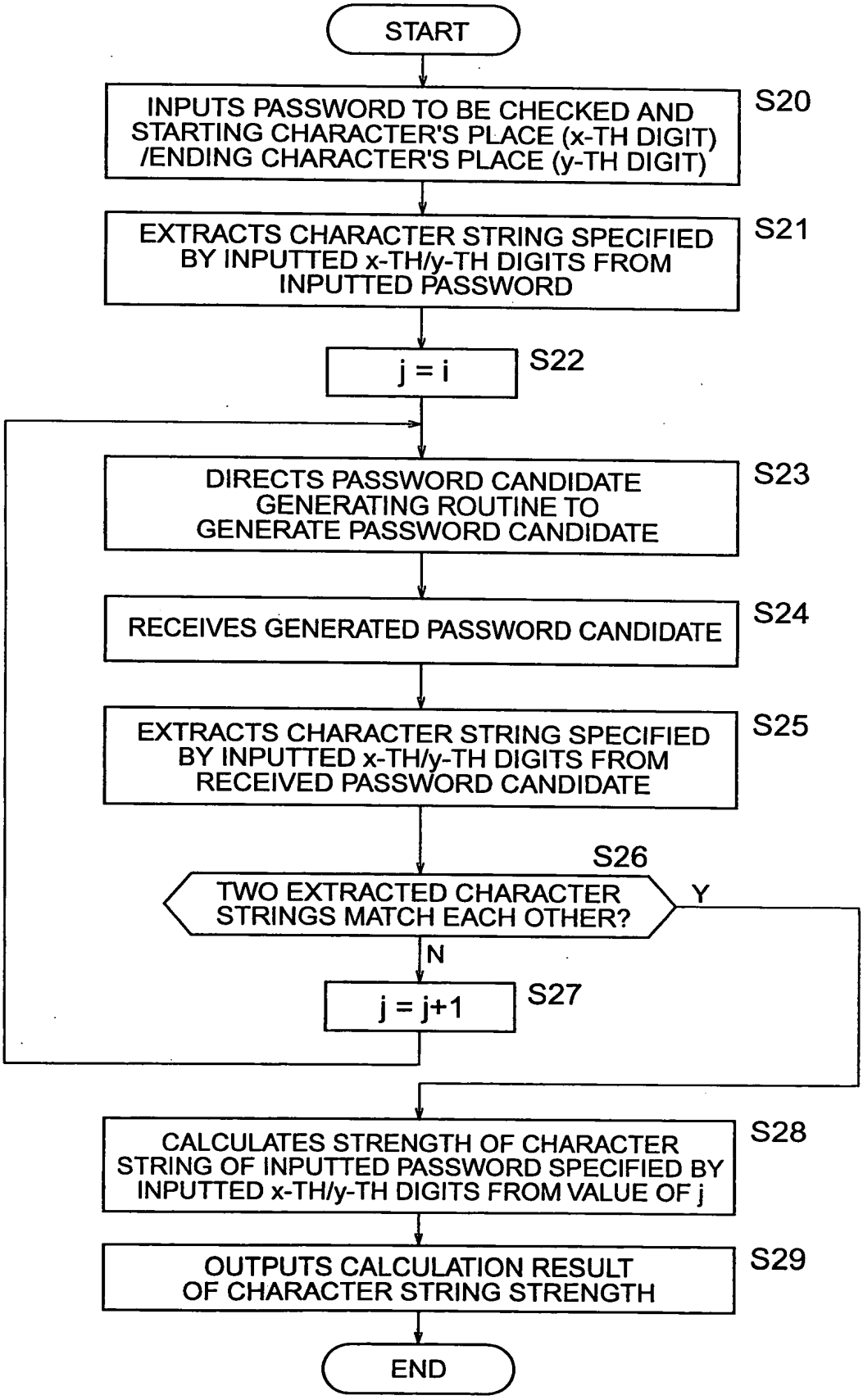

START
INPUTS PASSWORD TO BE CHECKED AND STARTING CHARACTER'S PLACE (x-TH DIGIT) /ENDING CHARACTER'S PLACE (y-TH DIGIT)
S20
EXTRACTS CHARACTER STRING SPECIFIED BY INPUTTED x-TH/y-TH DIGITS FROM INPUTTED PASSWORD
S21
j = i
S22
DIRECTS PASSWORD CANDIDATE GENERATING ROUTINE TO GENERATE PASSWORD CANDIDATE
S23
RECEIVES GENERATED PASSWORD CANDIDATE
S24
EXTRACTS CHARACTER STRING SPECIFIED BY INPUTTED x-TH/y-TH DIGITS FROM RECEIVED PASSWORD CANDIDATE
S25
S26
TWO EXTRACTED CHARACTER STRINGS MATCH EACH OTHER?
Y
N
j = j+1
S27
CALCULATES STRENGTH OF CHARACTER STRING OF INPUTTED PASSWORD SPECIFIED BY INPUTTED x-TH/y-TH DIGITS FROM VALUE OF j
S28
OUTPUTS CALCULATION RESULT OF CHARACTER STRING STRENGTH
S29
END

FIG. 12

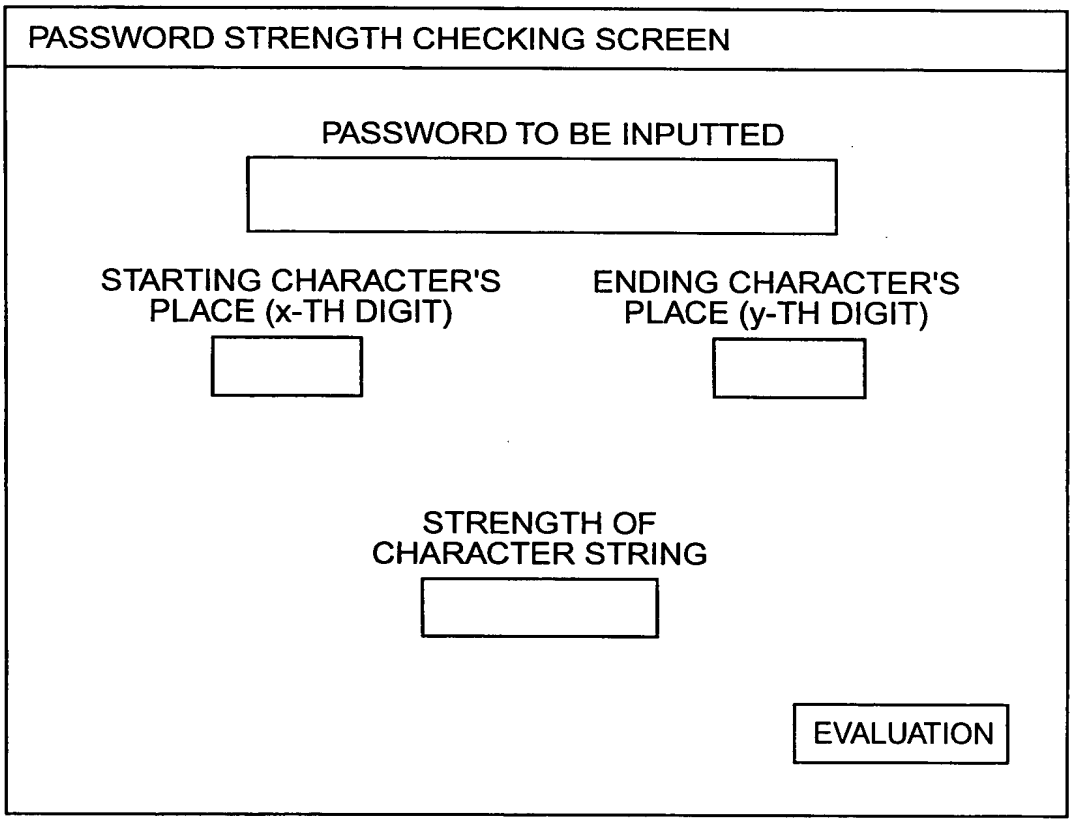

PASSWORD STRENGTH CHECKING SCREEN
PASSWORD TO BE INPUTTED
STARTING CHARACTER'S PLACE (x-TH DIGIT)
ENDING CHARACTER'S PLACE (y-TH DIGIT)
STRENGTH OF CHARACTER STRING
EVALUATION

FIG. 13

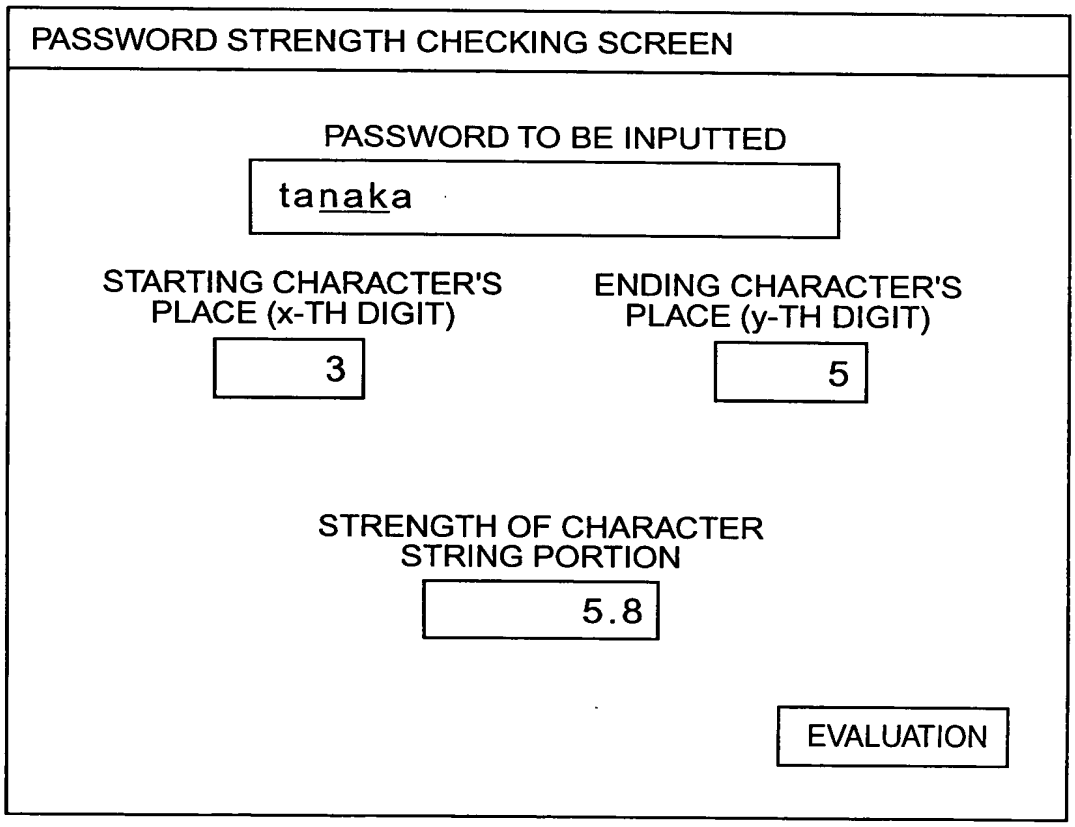

PASSWORD STRENGTH CHECKING SCREEN
PASSWORD TO BE INPUTTED
tanaka
STARTING CHARACTER'S PLACE (x-TH DIGIT)
3
ENDING CHARACTER'S PLACE (y-TH DIGIT)
5
STRENGTH OF CHARACTER STRING PORTION
5.8
EVALUATION

FIG. 14

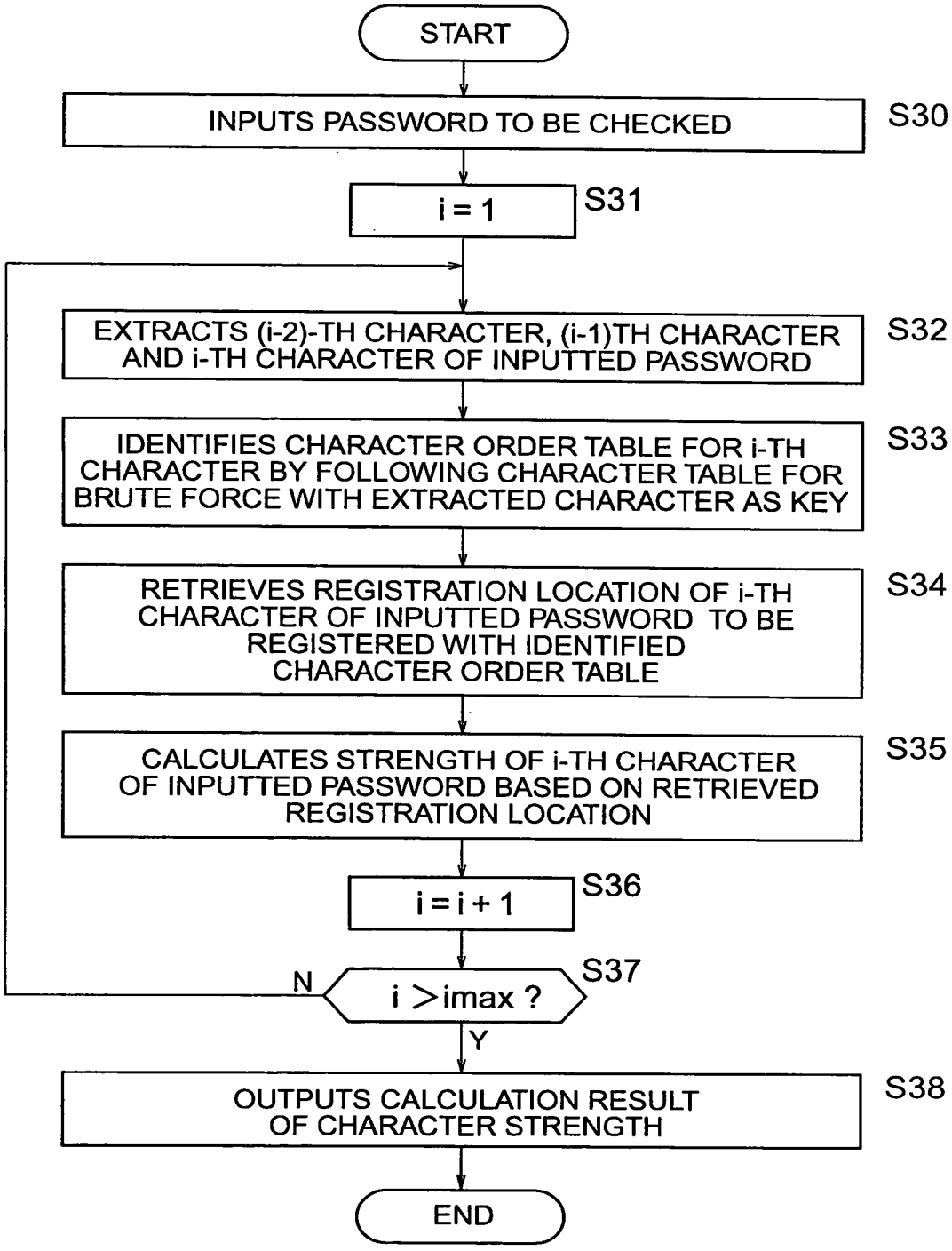

START
INPUTS PASSWORD TO BE CHECKED
S30
i = 1
S31
EXTRACTS (i-2)-TH CHARACTER, (i-1)TH CHARACTER AND i-TH CHARACTER OF INPUTTED PASSWORD
S32
IDENTIFIES CHARACTER ORDER TABLE FOR i-TH CHARACTER BY FOLLOWING CHARACTER TABLE FOR BRUTE FORCE WITH EXTRACTED CHARACTER AS KEY
S33
RETRIEVES REGISTRATION LOCATION OF i-TH CHARACTER OF INPUTTED PASSWORD TO BE REGISTERED WITH IDENTIFIED CHARACTER ORDER TABLE
S34
CALCULATES STRENGTH OF i-TH CHARACTER OF INPUTTED PASSWORD BASED ON RETRIEVED REGISTRATION LOCATION
S35
i = i + 1
S36
N
i > imax ?
S37
Y
OUTPUTS CALCULATION RESULT OF CHARACTER STRENGTH
S38
END

FIG. 15

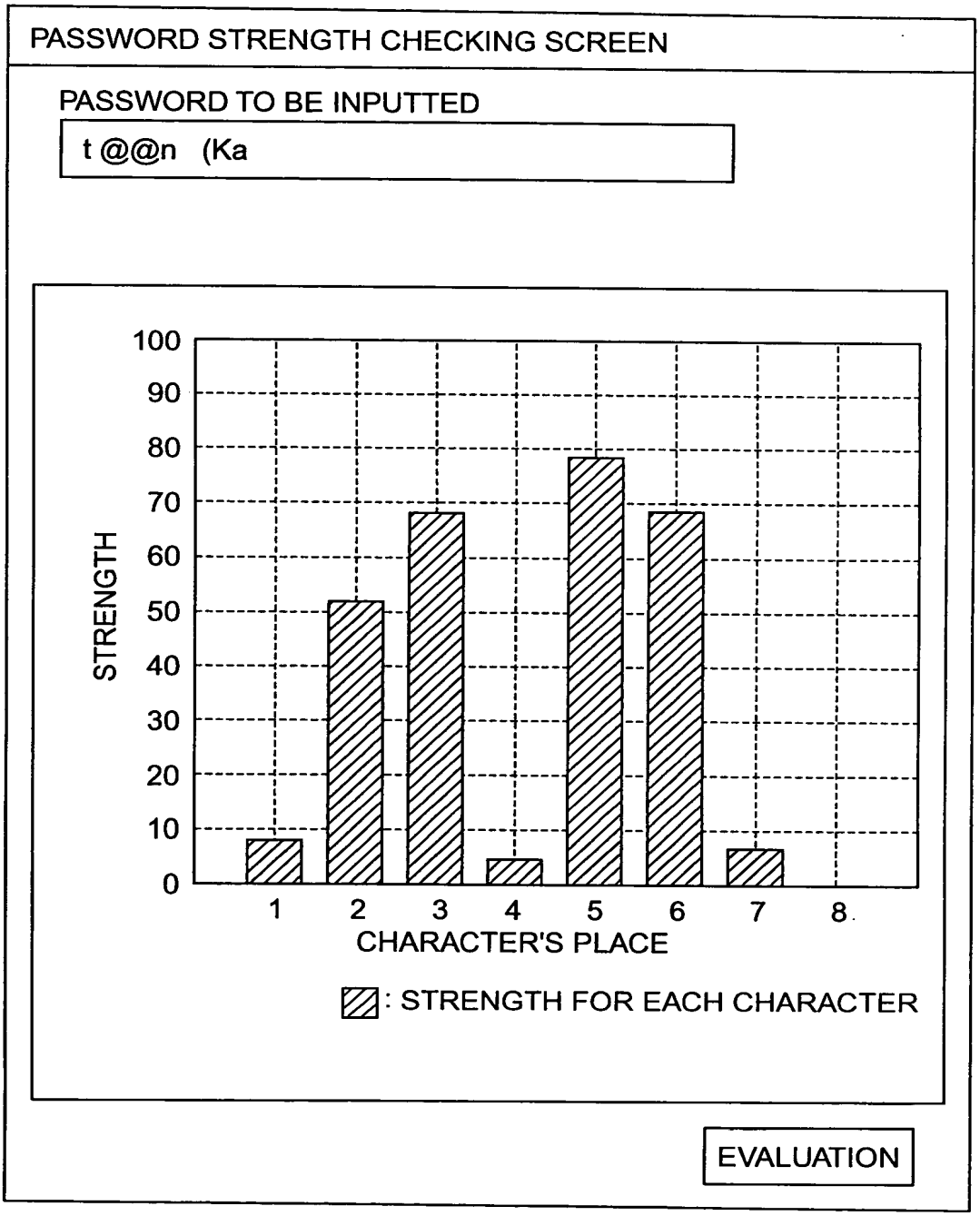

PASSWORD STRENGTH CHECKING SCREEN
PASSWORD TO BE INPUTTED
t @@n (Ka
100
90
80
70
60
50
40
30
20
10
0
STRENGTH
1
2
3
4
5
6
7
8
CHARACTER'S PLACE
: STRENGTH FOR EACH CHARACTER
EVALUATION

FIG. 16

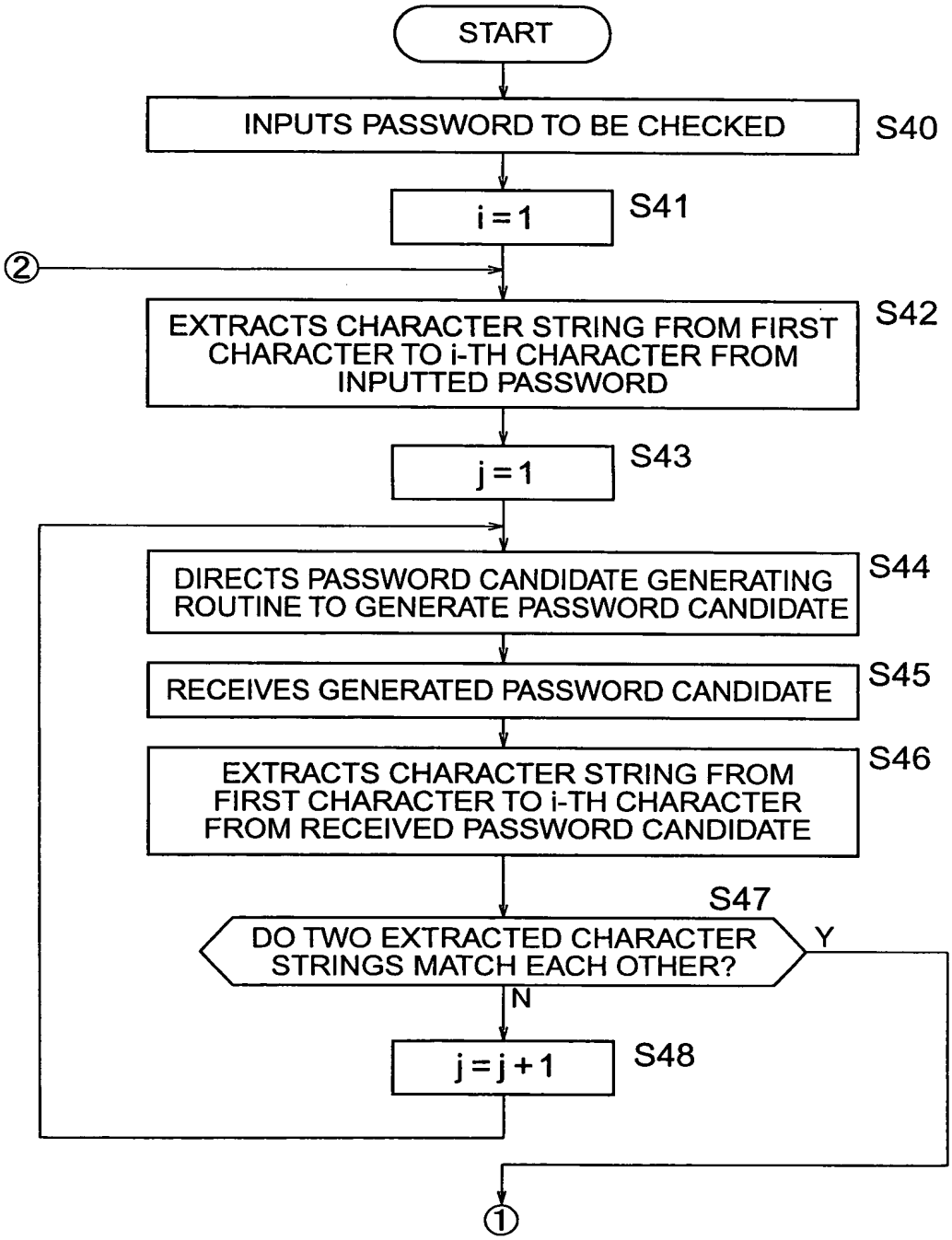

START
INPUTS PASSWORD TO BE CHECKED
S40
i = 1
S41
②
EXTRACTS CHARACTER STRING FROM FIRST CHARACTER TO i-TH CHARACTER FROM INPUTTED PASSWORD
S42
j = 1
S43
DIRECTS PASSWORD CANDIDATE GENERATING ROUTINE TO GENERATE PASSWORD CANDIDATE
S44
RECEIVES GENERATED PASSWORD CANDIDATE
S45
EXTRACTS CHARACTER STRING FROM FIRST CHARACTER TO i-TH CHARACTER FROM RECEIVED PASSWORD CANDIDATE
S46
S47
DO TWO EXTRACTED CHARACTER STRINGS MATCH EACH OTHER?
Y
N
j = j + 1
S48
①

FIG. 17

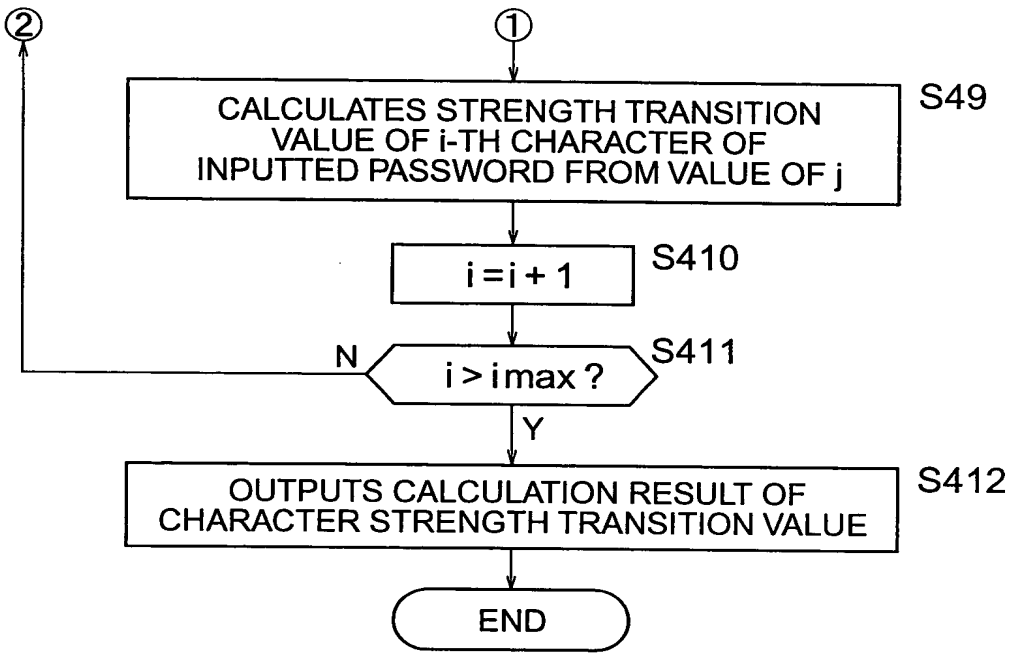

②
①
CALCULATES STRENGTH TRANSITION VALUE OF i-TH CHARACTER OF INPUTTED PASSWORD FROM VALUE OF j
S49
i=i+1
S410
N
i>imax?
S411
Y
OUTPUTS CALCULATION RESULT OF CHARACTER STRENGTH TRANSITION VALUE
S412
END

FIG. 18

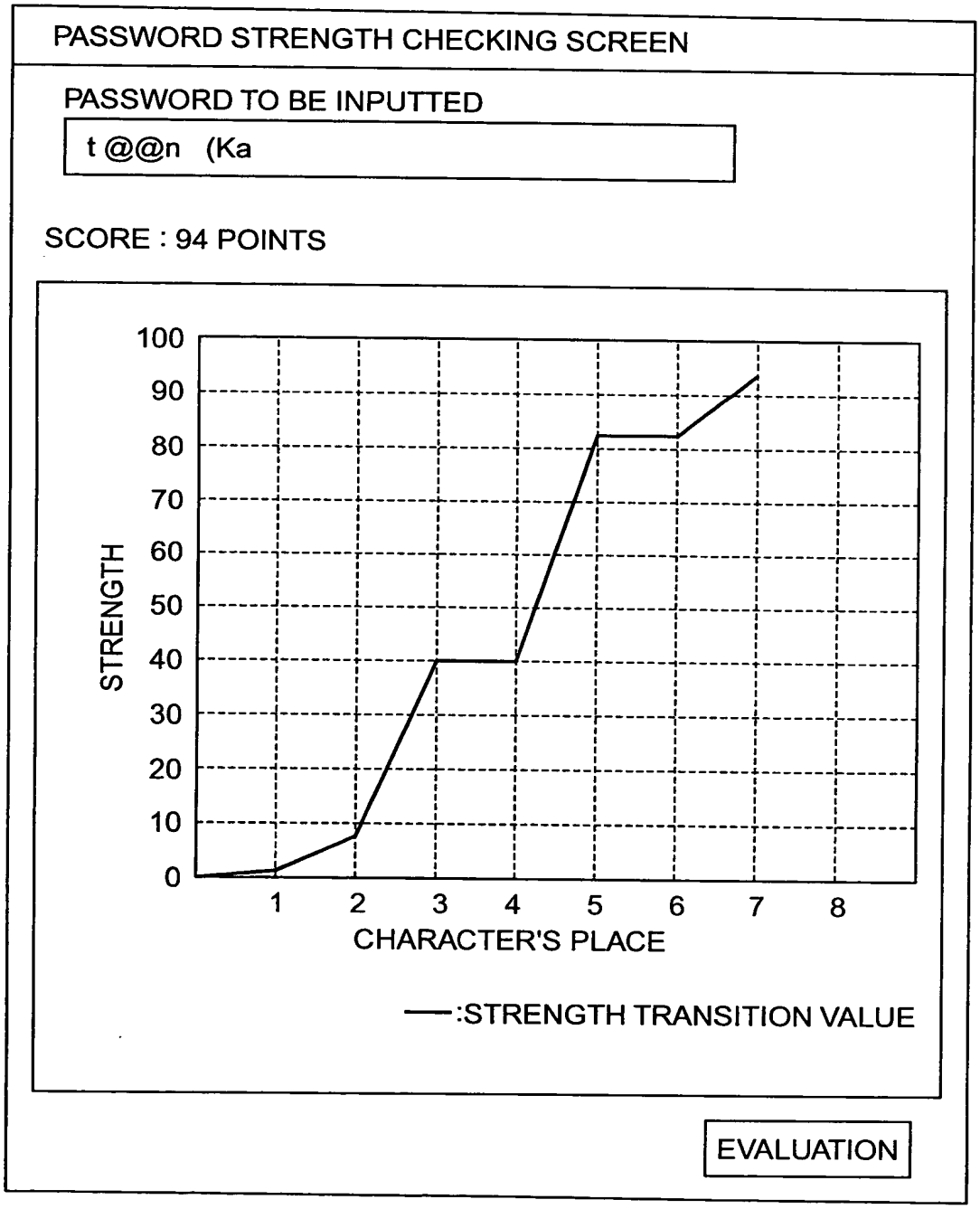

PASSWORD STRENGTH CHECKING SCREEN
PASSWORD TO BE INPUTTED
t @@n (Ka
SCORE : 94 POINTS
100
90
80
70
60
50
40
30
20
10
0
STRENGTH
1
2
3
4
5
6
7
8
CHARACTER'S PLACE
—:STRENGTH TRANSITION VALUE
EVALUATION

FIG. 19

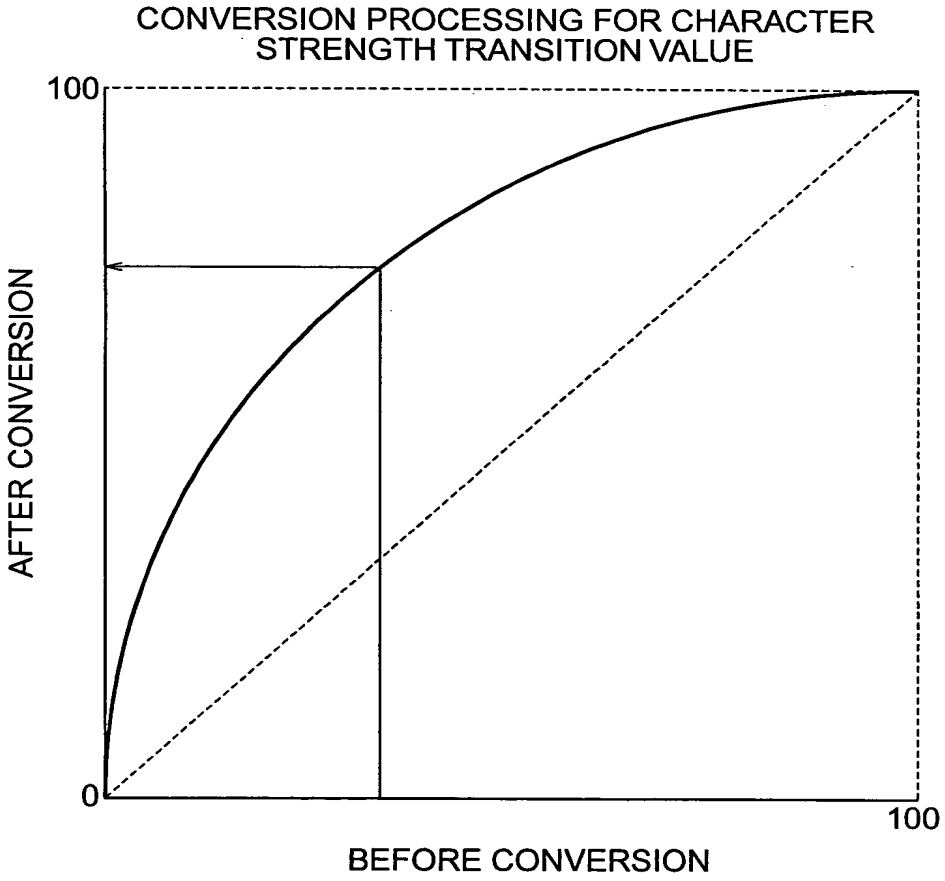

CONVERSION PROCESSING FOR CHARACTER STRENGTH TRANSITION VALUE
100
0
100
AFTER CONVERSION
BEFORE CONVERSION

FIG. 20

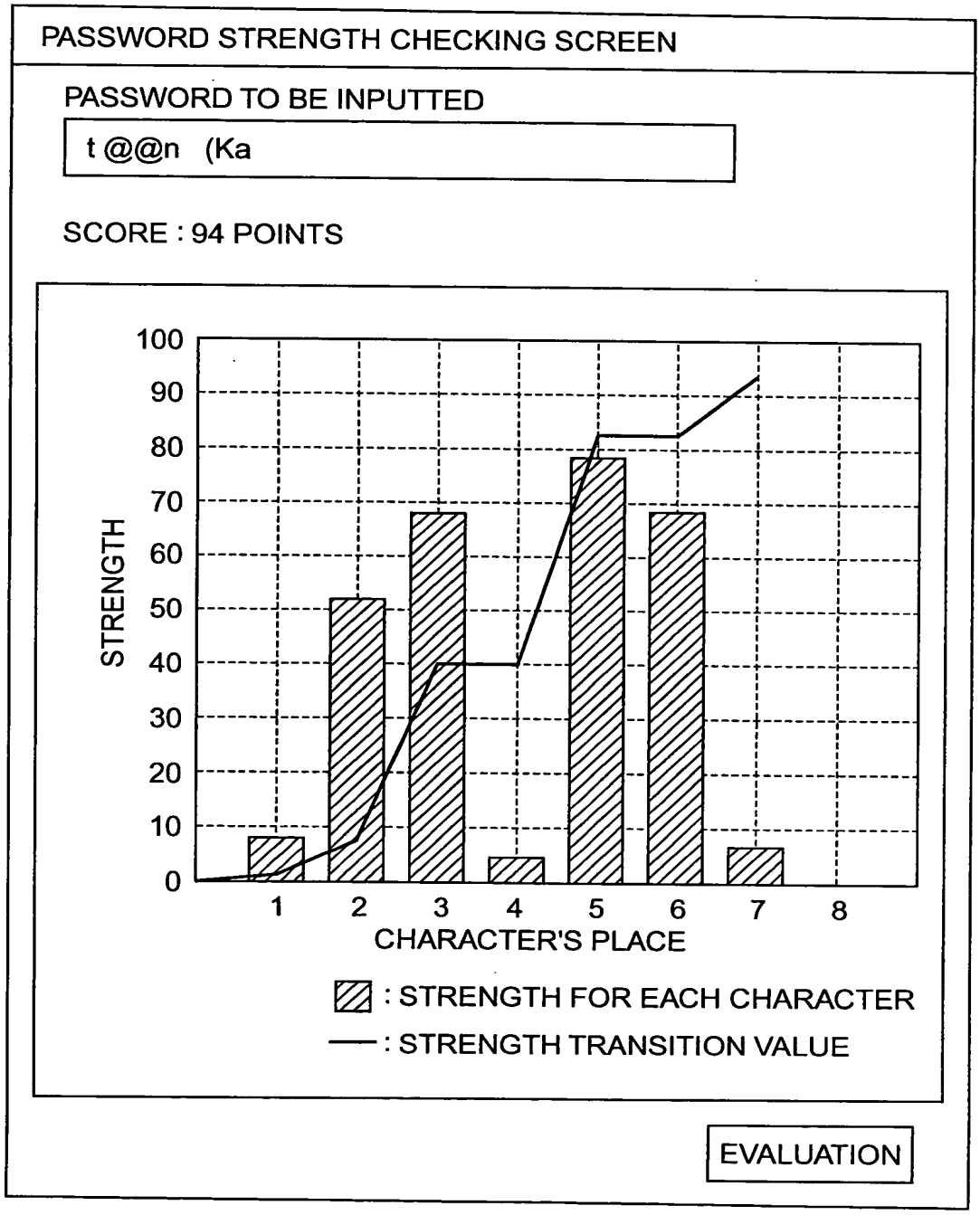
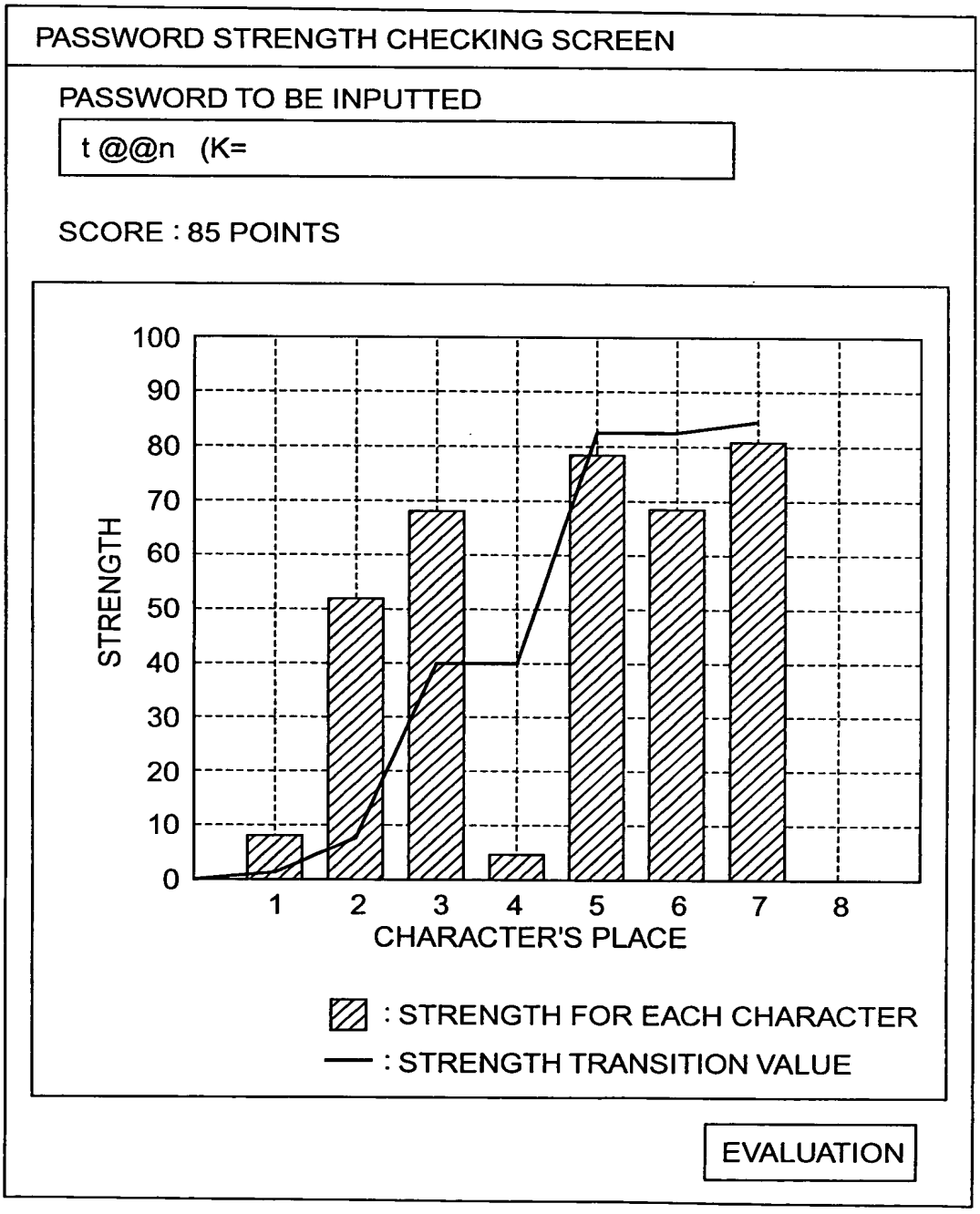

PASSWORD STRENGTH CHECKING SCREEN
PASSWORD TO BE INPUTTED
t @@n (Ka
SCORE : 94 POINTS
100
90
80
70
60
50
40
30
20
10
0
STRENGTH
1
2
3
4
5
6
7
8
CHARACTER'S PLACE
: STRENGTH FOR EACH CHARACTER
: STRENGTH TRANSITION VALUE
EVALUATION

FIG. 21


PASSWORD STRENGTH CHECKING SCREEN
PASSWORD TO BE INPUTTED
t @@n (K=
SCORE : 85 POINTS
STRENGTH
100
90
80
70
60
50
40
30
20
10
0
1
2
3
4
5
6
7
8
CHARACTER'S PLACE
: STRENGTH FOR EACH CHARACTER
: STRENGTH TRANSITION VALUE
EVALUATION

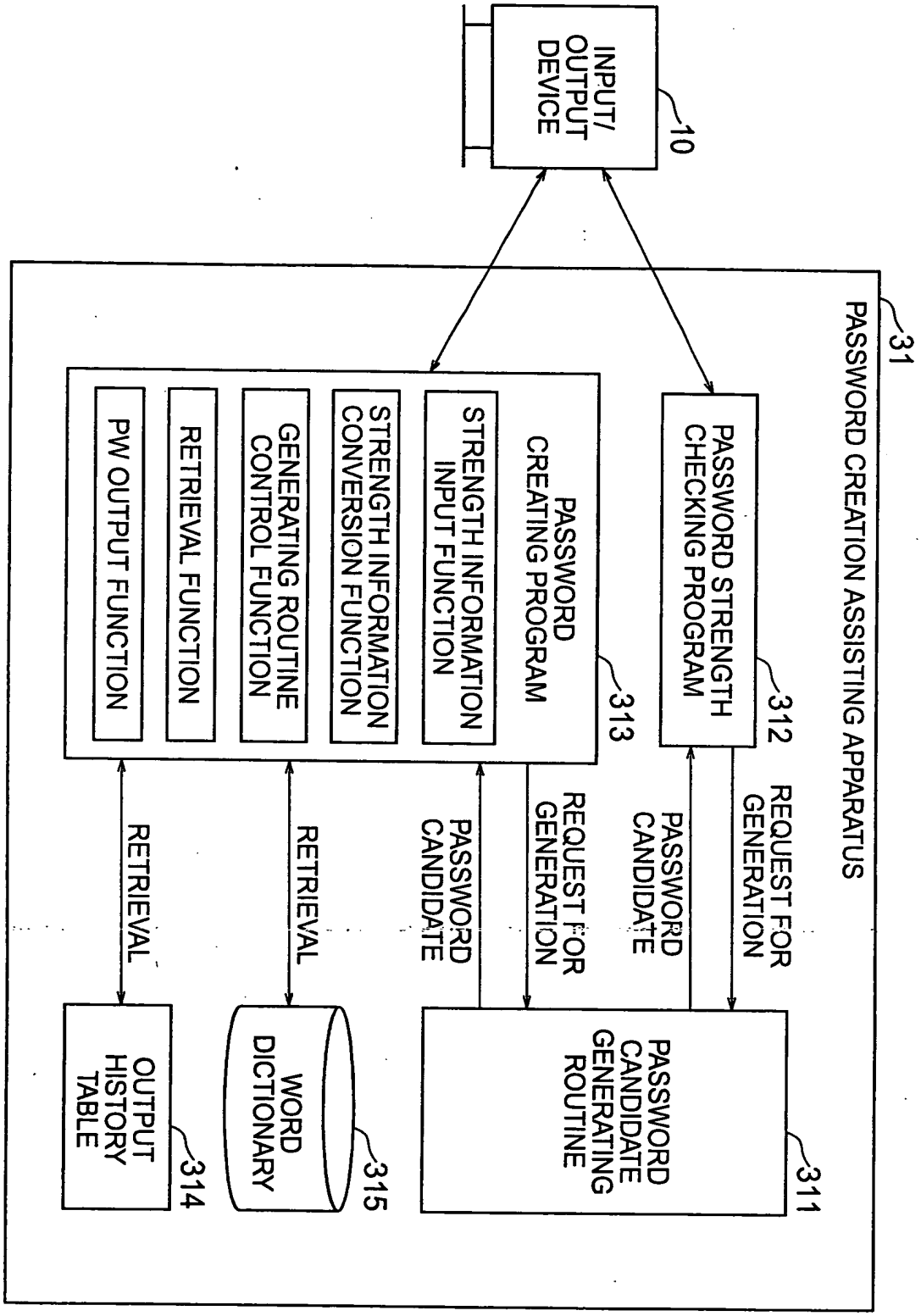

INPUT/ OUTPUT DEVICE
10
31
PASSWORD CREATION ASSISTING APPARATUS
PASSWORD STRENGTH CHECKING PROGRAM
312
PASSWORD CREATING PROGRAM
313
STRENGTH INFORMATION INPUT FUNCTION
STRENGTH INFORMATION CONVERSION FUNCTION
GENERATING ROUTINE CONTROL FUNCTION
RETRIEVAL FUNCTION
PW OUTPUT FUNCTION
REQUEST FOR GENERATION
PASSWORD CANDIDATE
REQUEST FOR GENERATION
PASSWORD CANDIDATE
RETRIEVAL
RETRIEVAL
PASSWORD CANDIDATE GENERATING ROUTINE
311
WORD DICTIONARY
315
OUTPUT HISTORY TABLE
314

FIG. 22

FIG. 23

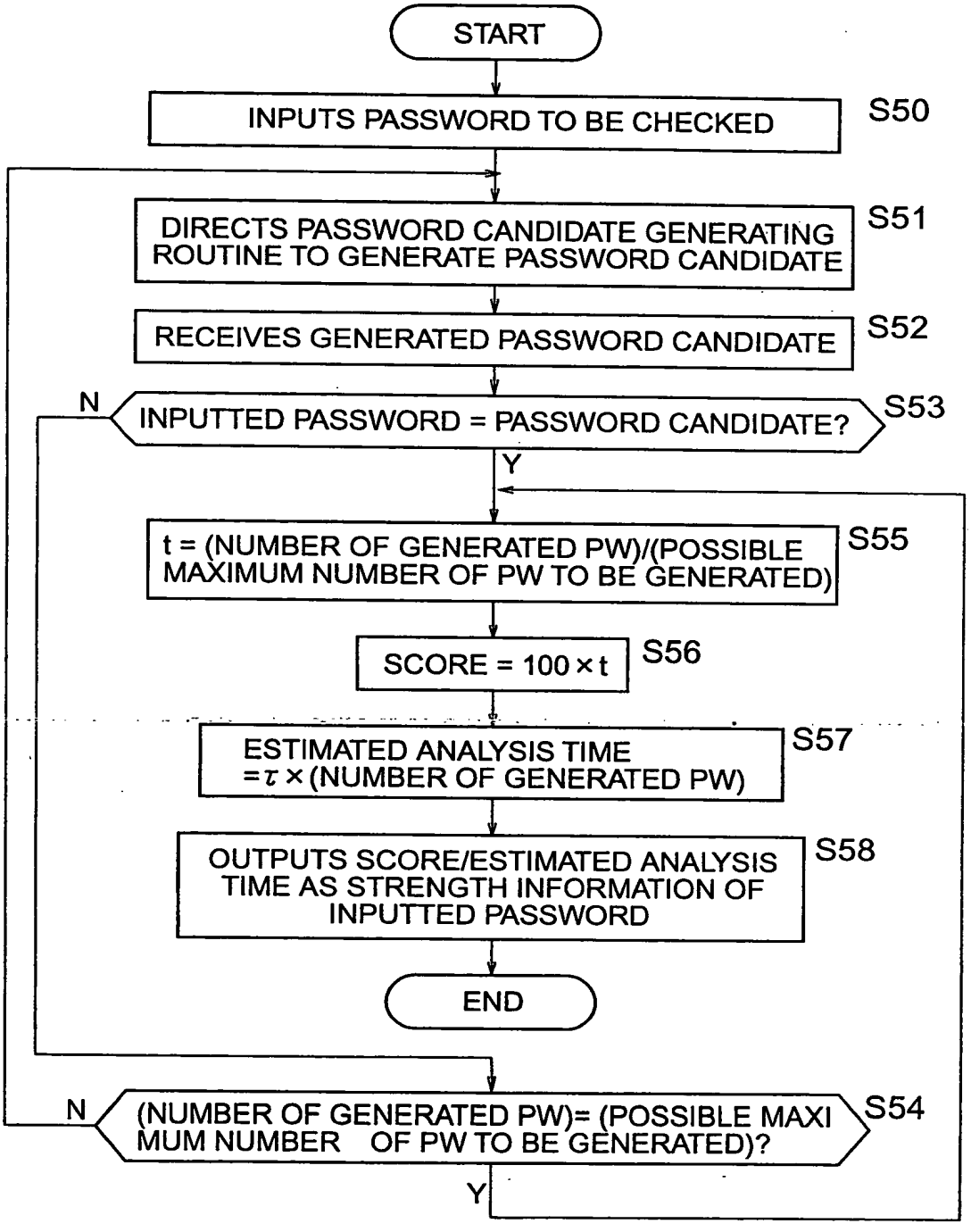

START
INPUTS PASSWORD TO BE CHECKED
S50
DIRECTS PASSWORD CANDIDATE GENERATING ROUTINE TO GENERATE PASSWORD CANDIDATE
S51
RECEIVES GENERATED PASSWORD CANDIDATE
S52
N
INPUTTED PASSWORD = PASSWORD CANDIDATE?
S53
Y
t = (NUMBER OF GENERATED PW)/(POSSIBLE MAXIMUM NUMBER OF PW TO BE GENERATED)
S55
SCORE = 100 × t
S56
ESTIMATED ANALYSIS TIME = τ × (NUMBER OF GENERATED PW)
S57
OUTPUTS SCORE/ESTIMATED ANALYSIS TIME AS STRENGTH INFORMATION OF INPUTTED PASSWORD
S58
END
N
(NUMBER OF GENERATED PW)= (POSSIBLE MAXIMUM NUMBER OF PW TO BE GENERATED)?
S54
Y

FIG. 24

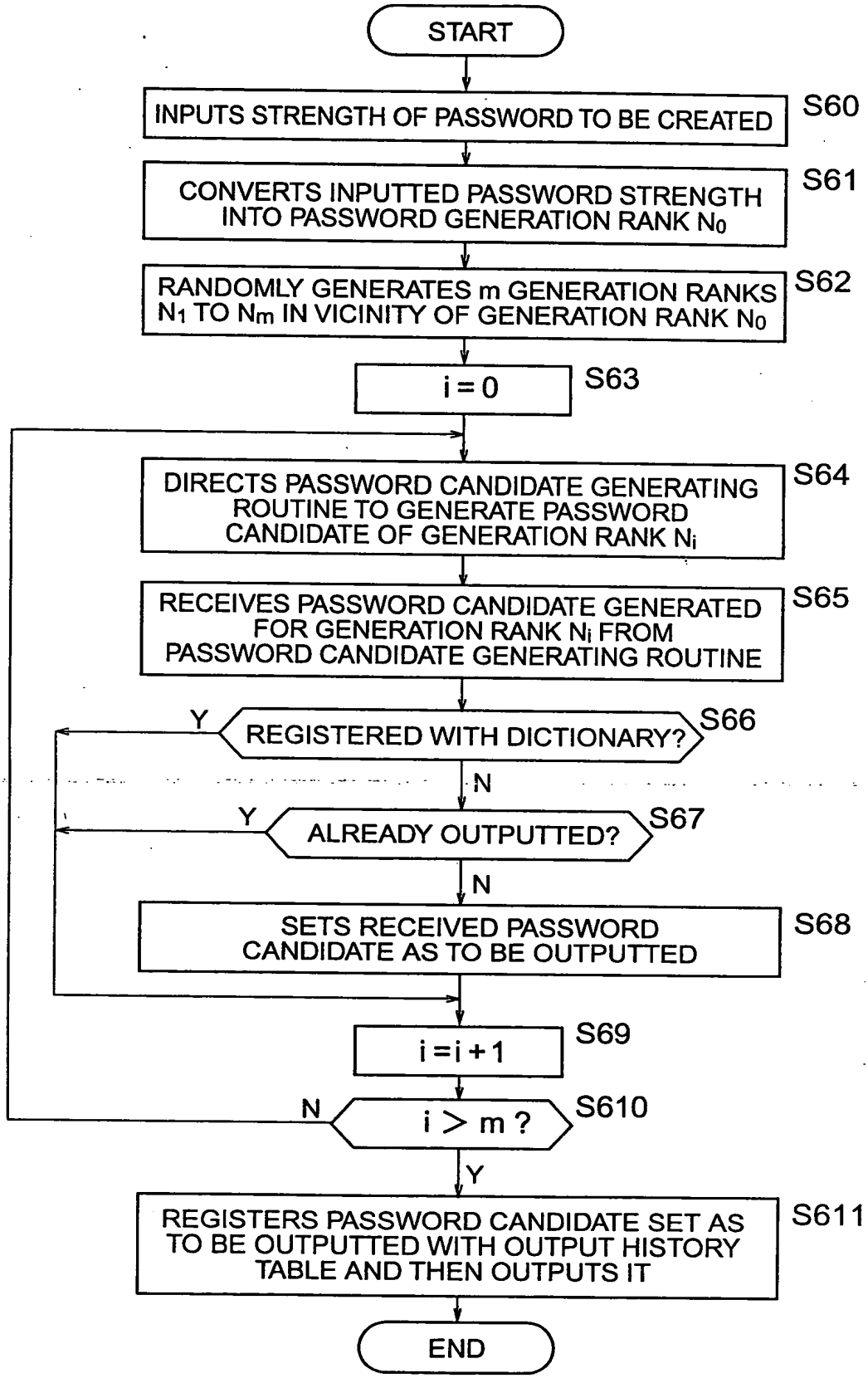
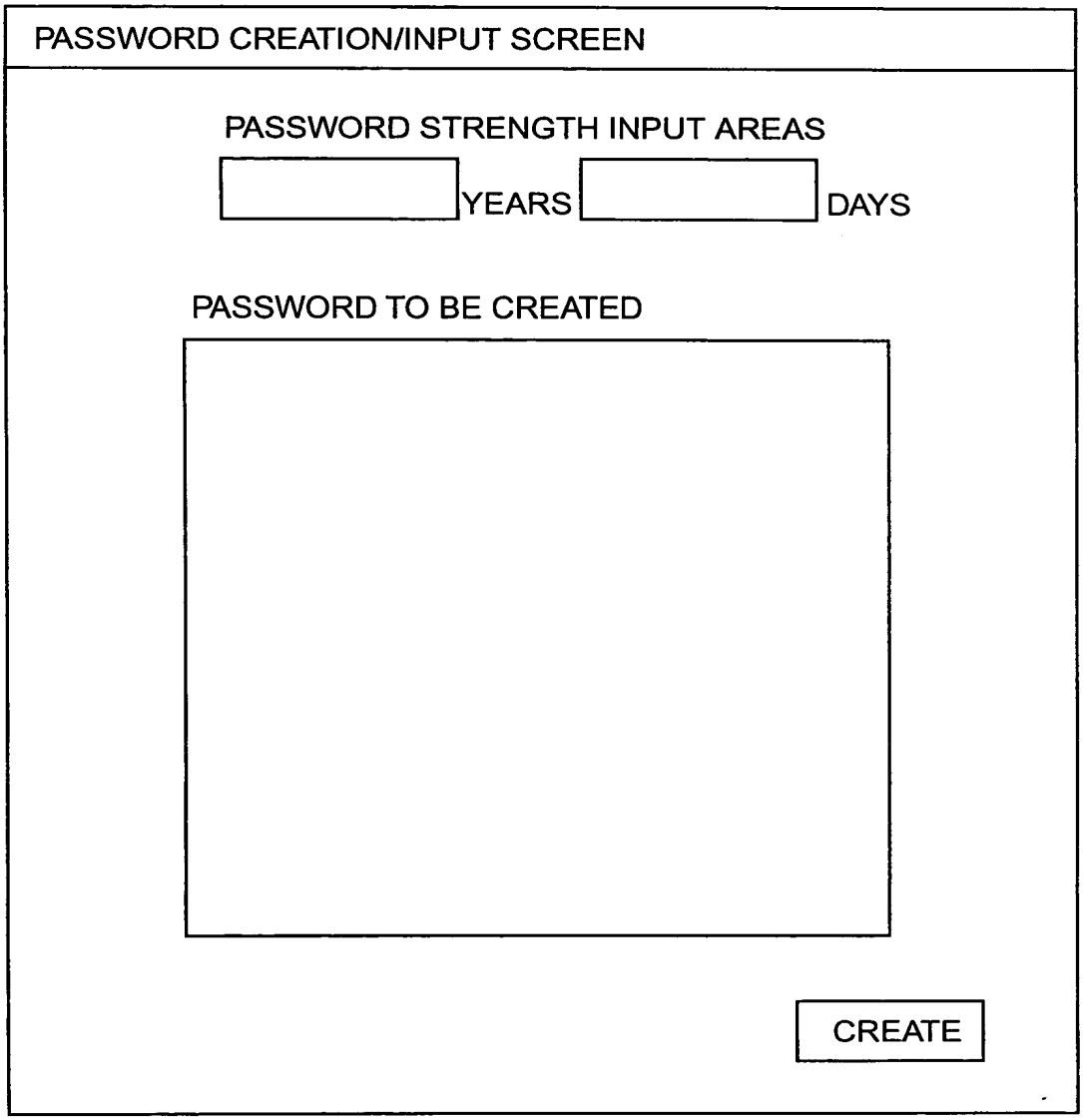

START
INPUTS STRENGTH OF PASSWORD TO BE CREATED
S60
CONVERTS INPUTTED PASSWORD STRENGTH INTO PASSWORD GENERATION RANK N_0
S61
RANDOMLY GENERATES m GENERATION RANKS N_1 TO N_m IN VICINITY OF GENERATION RANK N_0
S62
i = 0
S63
DIRECTS PASSWORD CANDIDATE GENERATING ROUTINE TO GENERATE PASSWORD CANDIDATE OF GENERATION RANK N_i
S64
RECEIVES PASSWORD CANDIDATE GENERATED FOR GENERATION RANK N_i FROM PASSWORD CANDIDATE GENERATING ROUTINE
S65
Y
REGISTERED WITH DICTIONARY?
S66
N
Y
ALREADY OUTPUTTED?
S67
N
SETS RECEIVED PASSWORD CANDIDATE AS TO BE OUTPUTTED
S68
i = i + 1
S69
N
i > m ?
S610
Y
REGISTERS PASSWORD CANDIDATE SET AS TO BE OUTPUTTED WITH OUTPUT HISTORY TABLE AND THEN OUTPUTS IT
S611
END

FIG. 25


PASSWORD CREATION/INPUT SCREEN
PASSWORD STRENGTH INPUT AREAS
YEARS
DAYS
PASSWORD TO BE CREATED
CREATE

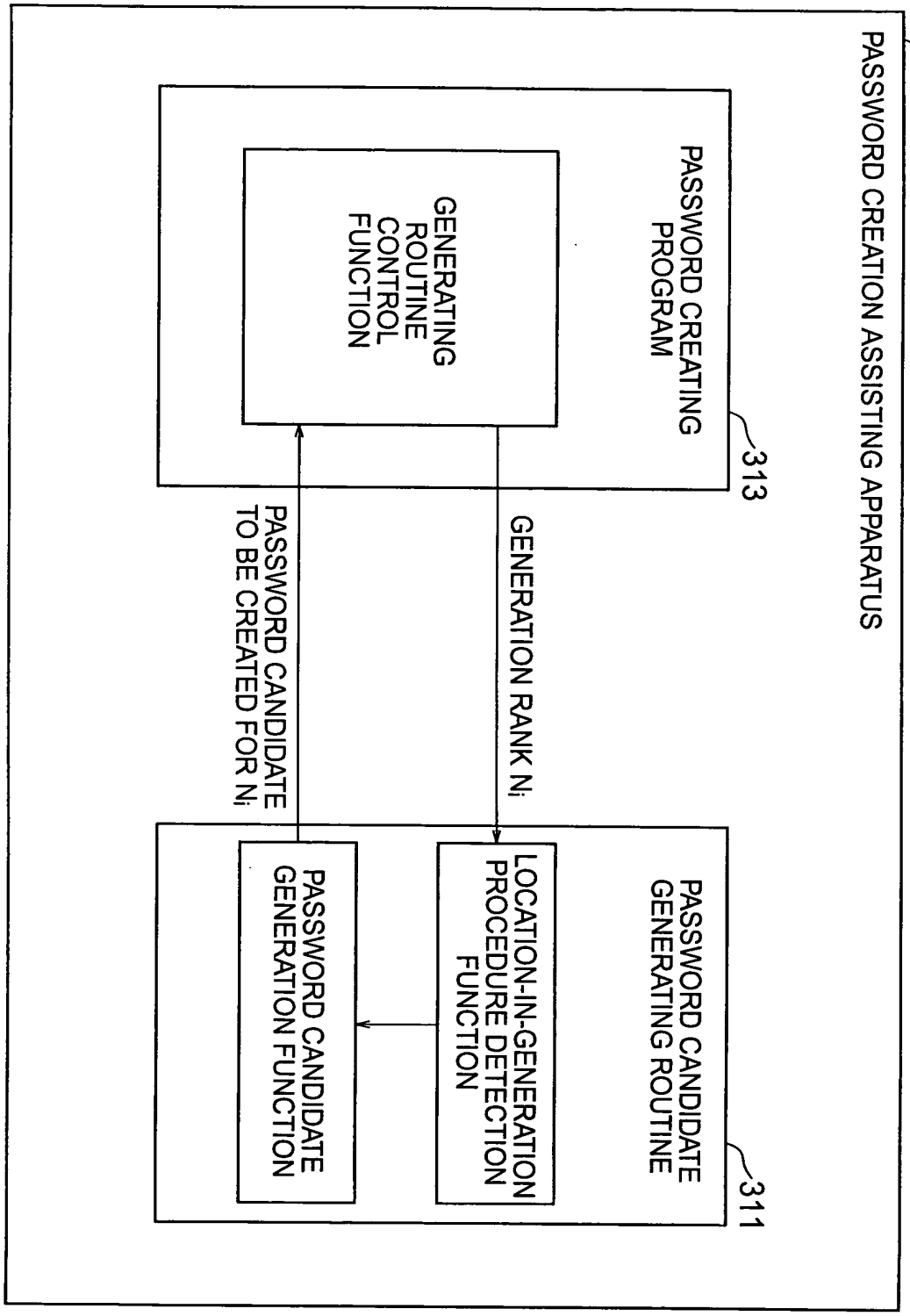
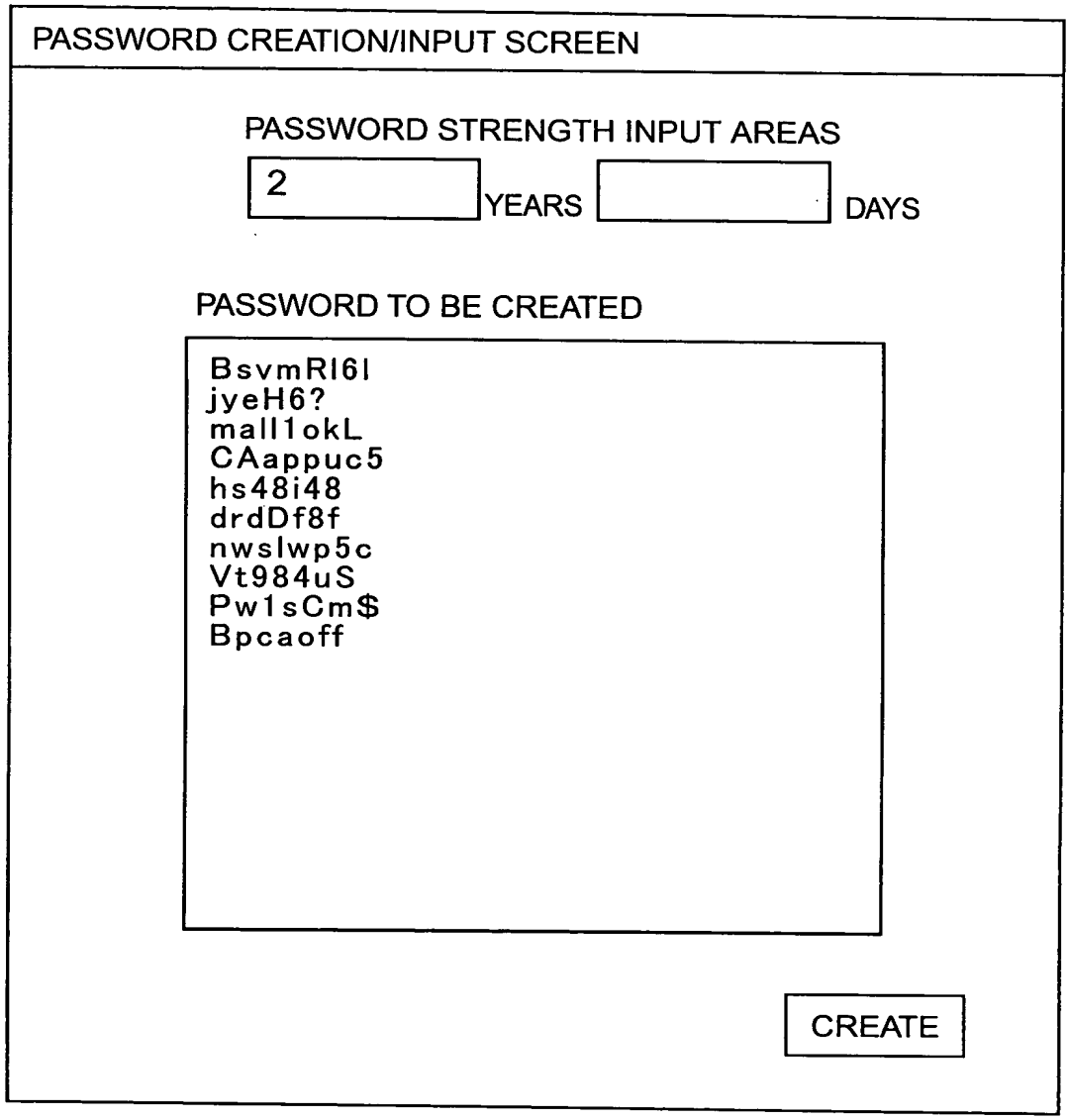

31
PASSWORD CREATION ASSISTING APPARATUS
PASSWORD CREATING PROGRAM
313
GENERATING ROUTINE CONTROL FUNCTION
GENERATION RANK Ni
PASSWORD CANDIDATE TO BE CREATED FOR Ni
PASSWORD CANDIDATE GENERATING ROUTINE
311
LOCATION-IN-GENERATION PROCEDURE DETECTION FUNCTION
PASSWORD CANDIDATE GENERATION FUNCTION

FIG. 26

FIG. 27


PASSWORD CREATION/INPUT SCREEN
PASSWORD STRENGTH INPUT AREAS
2
YEARS
DAYS
PASSWORD TO BE CREATED
BsvmRI6l
jyeH6?
mall1okL
CAappuc5
hs48i48
drdDf8f
nwslwp5c
Vt984uS
Pw1sCm$
Bpcaoff
CREATE

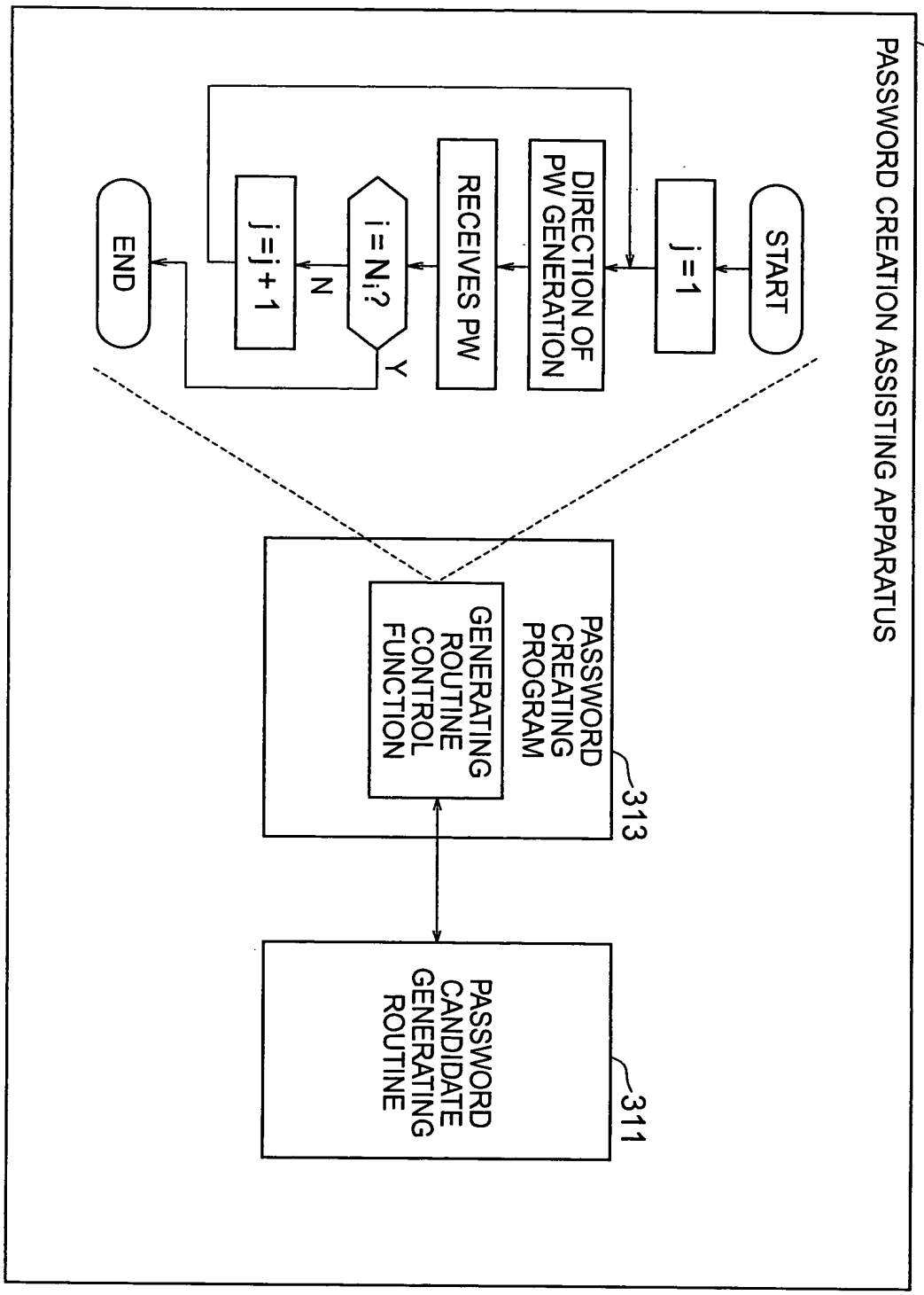

31
PASSWORD CREATION ASSISTING APPARATUS
START
j = 1
DIRECTION OF PW GENERATION
RECEIVES PW
i = Ni?
N
Y
j = j + 1
END
PASSWORD CREATING PROGRAM
GENERATING ROUTINE CONTROL FUNCTION
313
PASSWORD CANDIDATE GENERATING ROUTINE
311

FIG. 28

FIG. 29

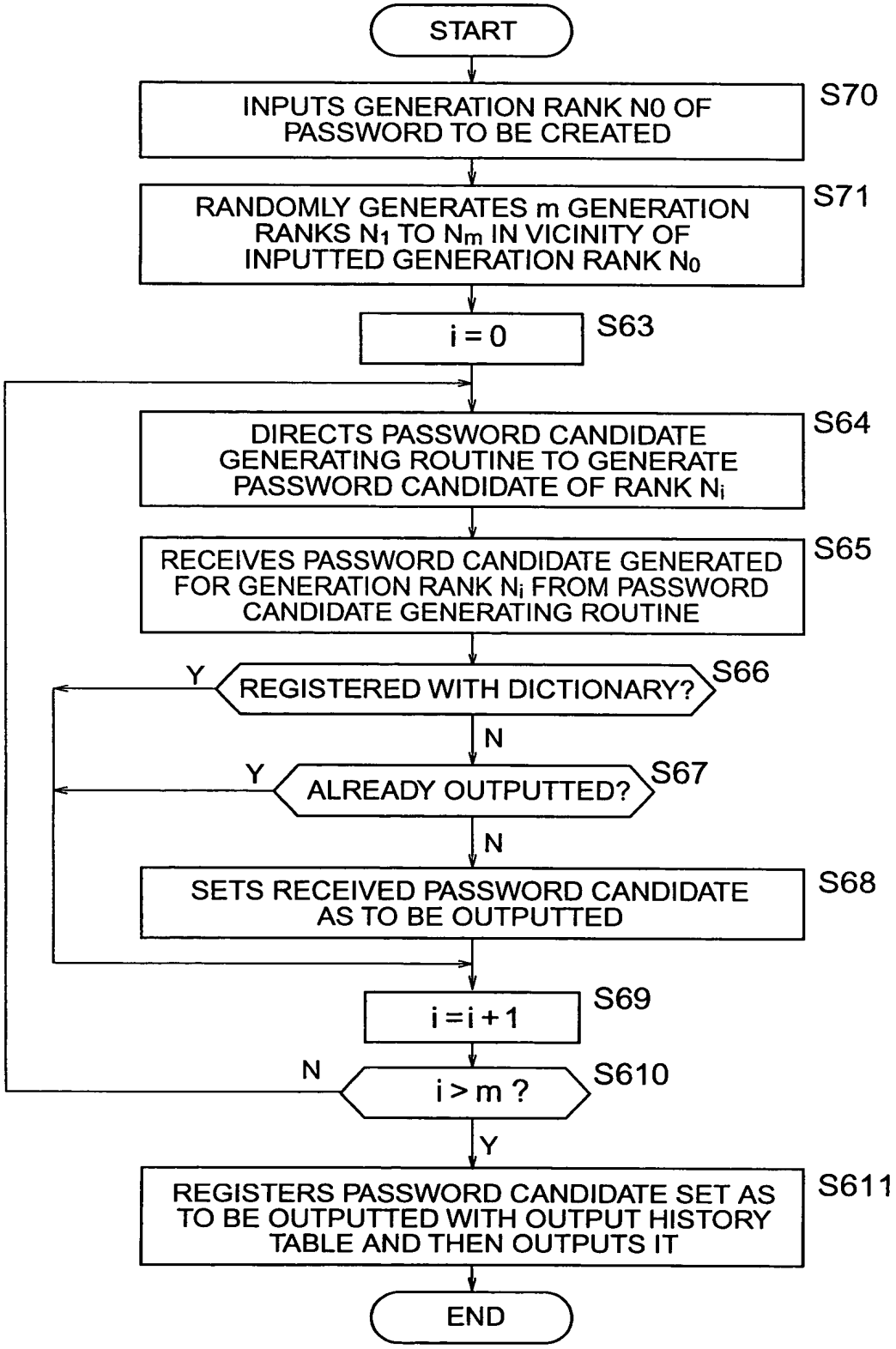
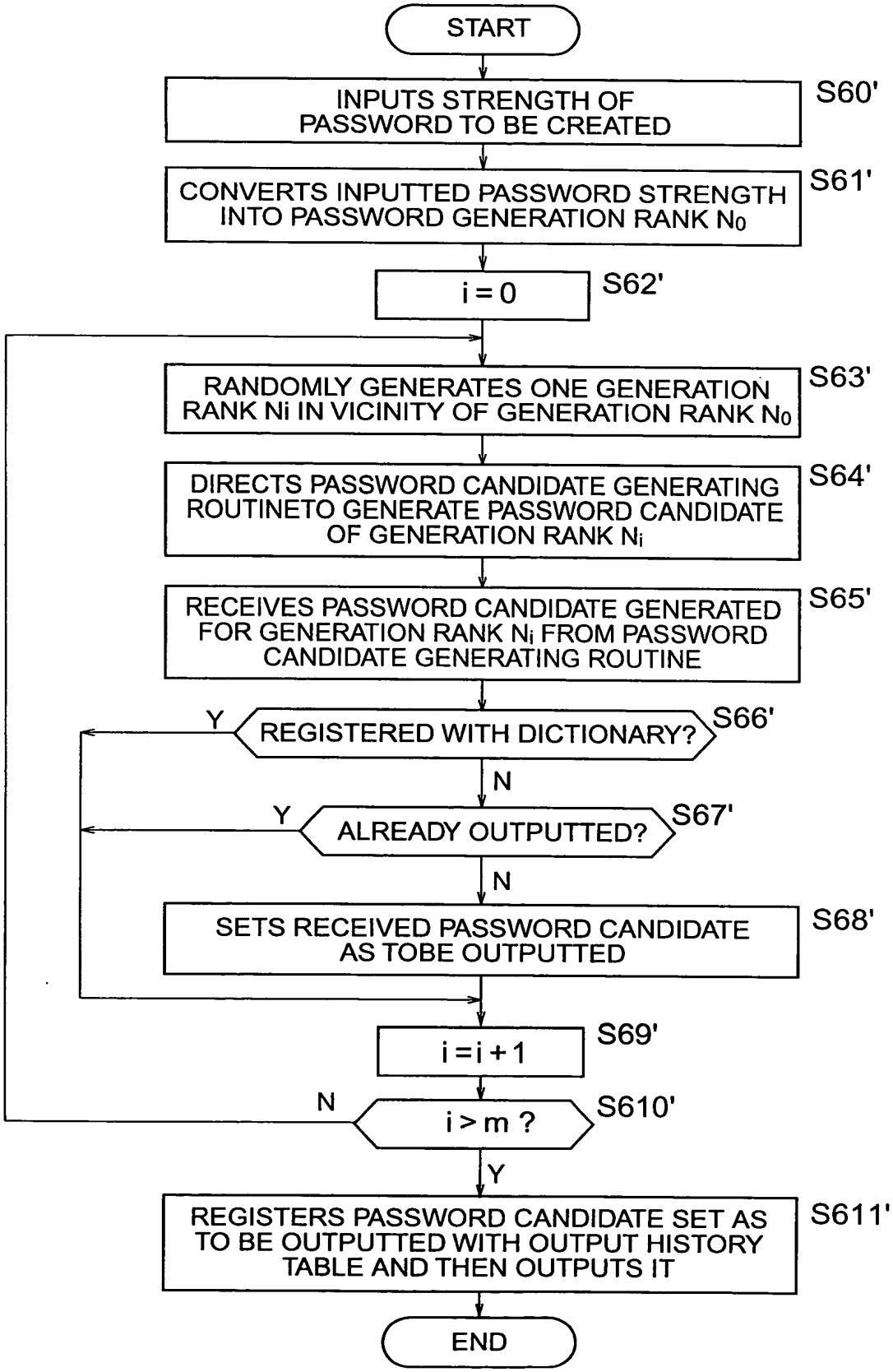

START
INPUTS GENERATION RANK N0 OF PASSWORD TO BE CREATED
S70
RANDOMLY GENERATES m GENERATION RANKS N_1 TO N_m IN VICINITY OF INPUTTED GENERATION RANK N_0
S71
i = 0
S63
DIRECTS PASSWORD CANDIDATE GENERATING ROUTINE TO GENERATE PASSWORD CANDIDATE OF RANK N_i
S64
RECEIVES PASSWORD CANDIDATE GENERATED FOR GENERATION RANK N_i FROM PASSWORD CANDIDATE GENERATING ROUTINE
S65
Y
REGISTERED WITH DICTIONARY?
S66
N
Y
ALREADY OUTPUTTED?
S67
N
SETS RECEIVED PASSWORD CANDIDATE AS TO BE OUTPUTTED
S68
i = i + 1
S69
N
i > m ?
S610
Y
REGISTERS PASSWORD CANDIDATE SET AS TO BE OUTPUTTED WITH OUTPUT HISTORY TABLE AND THEN OUTPUTS IT
S611
END

FIG. 30


START
INPUTS STRENGTH OF PASSWORD TO BE CREATED
S60'
CONVERTS INPUTTED PASSWORD STRENGTH INTO PASSWORD GENERATION RANK N0
S61'
i = 0
S62'
RANDOMLY GENERATES ONE GENERATION RANK Ni IN VICINITY OF GENERATION RANK N0
S63'
DIRECTS PASSWORD CANDIDATE GENERATING ROUTINETO GENERATE PASSWORD CANDIDATE OF GENERATION RANK Ni
S64'
RECEIVES PASSWORD CANDIDATE GENERATED FOR GENERATION RANK Ni FROM PASSWORD CANDIDATE GENERATING ROUTINE
S65'
Y
REGISTERED WITH DICTIONARY?
S66'
N
Y
ALREADY OUTPUTTED?
S67'
N
SETS RECEIVED PASSWORD CANDIDATE AS TOBE OUTPUTTED
S68'
i = i + 1
S69'
N
i > m ?
S610'
Y
REGISTERS PASSWORD CANDIDATE SET AS TO BE OUTPUTTED WITH OUTPUT HISTORY TABLE AND THEN OUTPUTS IT
S611'
END

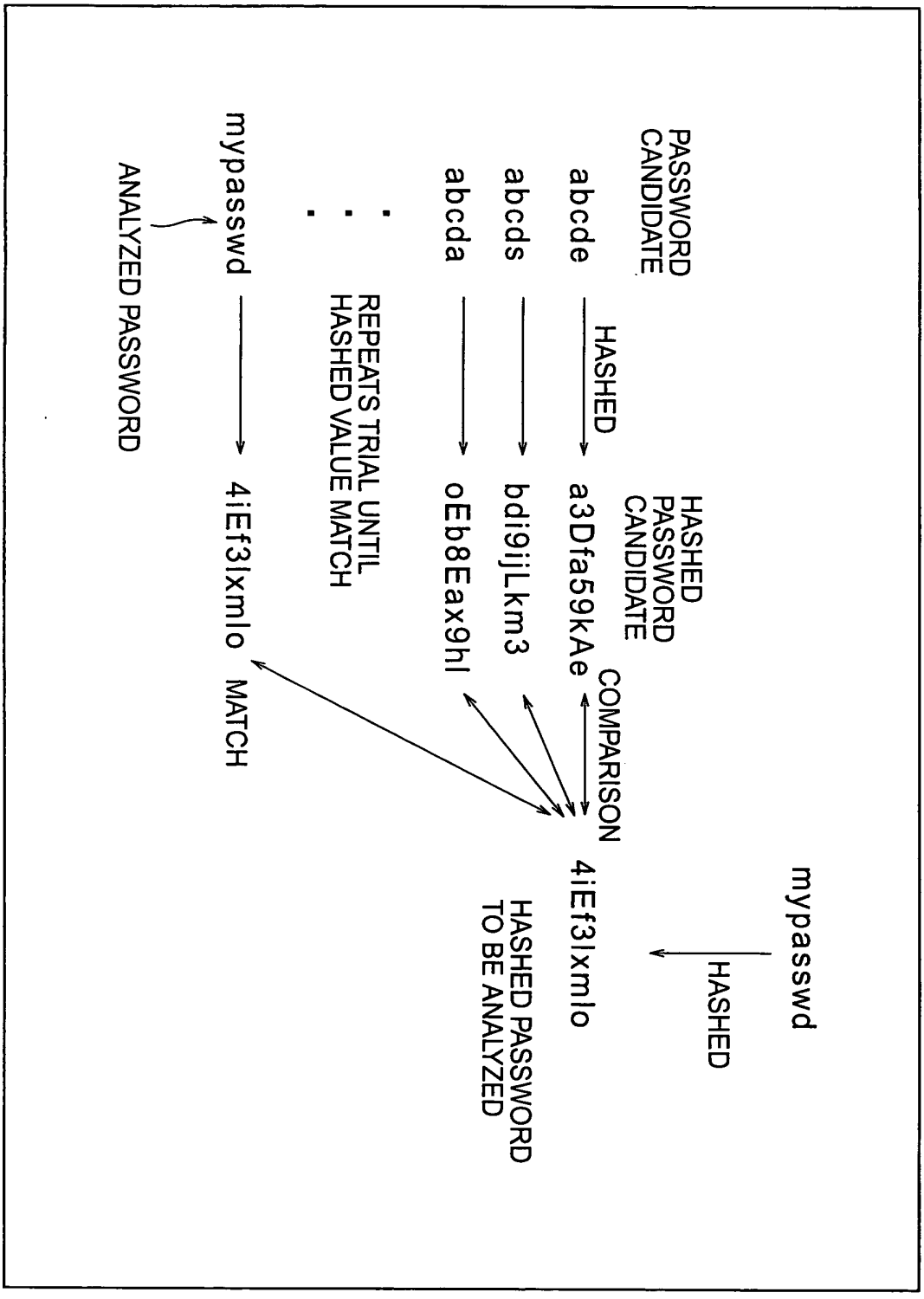

mypasswd
HASHED
4iEf3lxmlo
HASHED PASSWORD TO BE ANALYZED
COMPARISON
PASSWORD CANDIDATE
HASHED
HASHED PASSWORD CANDIDATE
abcde
a3Dfa59kAe
abcds
bdi9ijLkm3
abcda
oEb8Eax9hl
REPEATS TRIAL UNTIL HASHED VALUE MATCH
mypasswd
4iEf3lxmlo
MATCH
ANALYZED PASSWORD

FIG. 31